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REPORT

OF THE

DIRECTOR OF THE MINT

UPON THE

PRODUCTION

OF THE

PRECIOUS METALS IN THE UNITED STATES

DURING THE

CALENDAR YEAR 1900.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.

1901.

TREASURY DEPARTMENT,

Document No. 2259.

Director of the Mint.

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LETTER OF TRANSMITTAL.

TREASURY DEPARTMENT,
BUREAU OF THE MINT,
Washington, D. C., December 9, 1901.

SIR: I have the honor to hand you herewith my report on the production of gold and silver in the United States and in the world for the calendar year 1900, together with such information as to their coinage and consumption as this Bureau has been able to gather. The returns for this country have been carefully obtained through officials and special agents of this Bureau, and the aggregate of precious metals reported has been actually traced from production to market. The figures are therefore conservative, but are believed approximately full. The statistics for foreign countries are obtained from official sources wherever governmental calculations are made, and where such returns can not be had the best obtainable estimates are given and the authority stated.

Respectfully,

GEO. E. ROBERTS,
Director of the Mint.

The SECRETARY OF THE TREASURY.

PART I.

PRODUCTION, EMPLOYMENT, AND MOVEMENT OF GOLD AND SILVER
IN THE UNITED STATES, AND SURVEY OF THE WORLD'S
PRODUCTION OF GOLD AND SILVER IN 1900.

GENERAL REPORT.

PRODUCTION OF GOLD IN THE UNITED STATES, CALENDAR YEAR 1900.

The production of gold in the United States in the calendar year 1900 was estimated at 119,126 kilograms, or 3,829,897 ounces, fine, of the value of \$79,171,000.

Australasia produced 110,591 kilograms, or 3,555,506 ounces, fine, of the value of \$73,498,900.

The United States stands to-day as the greatest gold producer among the nations of the world.

The production of 1900 was fully equal to the output of the Transvaal in 1898, or that of Australasia in 1899, the largest ever reached by either of those countries.

Next after these the main gold-producing countries follow: Canada with 41,951 kilograms, valued at \$27,880,500; Russia with 30,312 kilograms, valued at \$20,145,500; British India with 14,197 kilograms, valued at \$9,435,500; Mexico with 13,542 kilograms, valued at \$9,000,000; Africa with 13,048 kilograms, valued at \$8,671,900; China with 8,387 kilograms, valued at \$5,574,400. Russia has changed places with Canada, which is due both to an increase of the latter's production and a decline in the production of Russia.

The war in the Transvaal has for the time eliminated Africa as a factor in the world's production of gold.

The countries above named aggregate, in round figures, 351,000 kilograms, valued at \$233,000,000, leaving 9 per cent to the remainder of the world, of which somewhat over one-half, or about 5 per cent of the world's product, was furnished by Central and South America.

The distribution of the product by political divisions gives the first place to Great Britain with her colonial empire, which produced in 1900, exclusive of African possessions, approximately 171,000 kilograms, of the value of \$113,000,000, which was a slight increase over the product of the previous year and amounted to 44 per cent of the world's production. The United States comes next with 31 per cent, that is, more than all the rest of the countries of the world. Together Great Britain and the United States control directly over three-quarters of the world's gold product.

The production of gold in the United States continued growing in 1900, outrunning by \$8,000,000 (in round figures) the output of the preceding year, which had been the largest in the history of gold mining in this country. The increase is due principally to Colorado, Alaska, and Arizona, which had showed increases in the preceding year as well. Increases also took place in California, which more than made up for the decrease of the former year, in Utah, Oregon, New Mexico, and some of the minor producing States of the United States. The greatest relative increase, amounting to 63 per cent, is noticed in Arizona; next after that follow Alaska with 49 per cent and

New Mexico with 42 per cent. Decreases of less than 10 per cent are reported from South Dakota, Nevada, Idaho, and Montana; decreases are further reported from the Carolinas, Texas, etc., where the production of gold is insignificant, amounting in all, in 1900, to \$190,800, or less than one-fourth of 1 per cent of the total output of the United States.

In estimating the gold yield of the United States in any given year only that gold is looked upon as really produced that has been refined, made ready for the market, and the ascertained amount of domestic origin (which is comparatively insignificant) that has been exported to foreign countries for reduction.

It has been the custom of the Bureau of the Mint to make for every calendar year two independent calculations of the gold product of the country, and to take their mean as the closest approximation that can be had to the actual output of the mines. The first of these is based on the amount of gold put upon the market by private refineries during the year, plus the fine gold contained in the unrefined of domestic production deposited at the mints and assay offices of the United States, plus the pure metal of domestic production contained in ores, copper matte, etc., exported to other countries for reduction. The second calculation is based on the known disposition made of the newly produced gold in any calendar year. Such gold is either deposited at the mints and assay offices of the United States, or exported from the United States in form of bullion, ores, or copper matte, or used in the industrial arts. If foreign gold bullion enters into any of the above items, its amount must of course be deducted.

Put in tabular form, the first calculation of the gold product of the United States in the calendar year 1900, assumes the following shape:

APPROXIMATE GOLD PRODUCT OF THE MINES OF THE UNITED STATES DURING THE
CALENDAR YEAR 1900.

Items reported for 1900.	Fine ounces.
Domestic product in fine gold bars, reported by private refineries.....	2, 691, 645
Unrefined gold of domestic production deposited at the mints and assay offices.....	1, 131, 926
Domestic gold contained in ores, copper matte, etc., exported for reduction.....	3, 383
Total	3, 826, 954

The second calculation of the gold yield of the mines of the United States in the calendar year 1900, reduced to a table, is as follows:

APPROXIMATE DISPOSITION OF THE GOLD PRODUCT OF THE MINES OF THE UNITED
STATES DURING THE CALENDAR YEAR 1900.

Disposition.	Fine ounces.
Bullion deposited at the mints and assay offices classified as of domestic production...	4, 579, 960
Less refinery bars deposited and reported to this Bureau as from old material.....	80, 149
Net new material deposited.....	4, 499, 811
Domestic bullion other than United States Mint or assay-office bars exported from the United States.....	5, 696
Domestic gold in ores, copper matte, etc., exported.....	3, 383
Bullion of domestic production reported by private refineries in the United States as having been made into bars for manufacturers and jewelers for use in the industrial arts.....	51, 255
Total	4, 560, 145
Deduct foreign bullion reported to the Bureau of the Mint by private refineries in the United States as contained in their product of fine gold bars deposited at the mints and assay offices or entered at the custom-houses for exportation as of domestic production, but derived from foreign ores.....	727, 326
Net total.....	3, 832, 819

The variance between the results of these calculations—5,865 ounces—is only 0.15 per cent, which is generally considered in statistics an exceedingly close approximation to the actual figures.

The average—3,829,897 ounces, or 119,126 kilograms, fine, of the value of \$79,171,000—may be taken as representing the actual output of the mines of the country.

The gold production for 1899 and 1900, with the increases and decreases in the various States and Territories, was as follows:

TABLE SHOWING THE PRODUCT OF GOLD IN THE SEVERAL STATES AND TERRITORIES IN 1899 AND 1900 AND THE INCREASE OR DECREASE OF THE PRODUCTION OF EACH IN THE LATTER YEAR.

State or Territory.	Value.			
	1899.	1900.	Increase.	Decrease.
Alaska	\$5,459,500	\$8,171,000	\$2,711,500	.....
Arizona	2,566,100	4,193,400	1,627,300	.....
California.....	15,197,800	15,816,200	618,400	.....
Colorado.....	25,982,800	28,829,400	2,846,600	.....
Georgia.....	113,000	116,700	3,700	.....
Idaho.....	1,889,000	1,724,700	.....	\$164,300
Michigan.....	100	29,000	28,900	.....
Montana.....	4,760,100	4,698,000	.....	62,100
Nevada.....	2,219,000	2,006,200	.....	212,800
New Mexico.....	584,100	832,900	248,800	.....
North Carolina.....	34,500	28,500	.....	6,000
Oregon.....	1,429,500	1,694,700	265,200	.....
South Carolina.....	160,100	121,000	.....	39,100
South Dakota.....	6,469,500	6,177,600	.....	291,900
Texas.....	6,900	1,100	.....	5,800
Utah.....	3,450,800	3,972,200	521,400	.....
Washington.....	685,400	718,200	32,800	.....
Alabama.....	45,200	40,200	.....	5,000
Maryland.....				
Minnesota.....				
Tennessee.....				
Vermont.....				
Virginia.....				
Wyoming.....				
Maine.....				
Missouri.....				
Total.....	71,053,400	79,171,000	8,904,600	787,000
Net increase.....	.....	.....	8,117,600	.....

3,829,897 fine ounces.

PRODUCTION OF SILVER IN THE UNITED STATES, CALENDAR YEAR 1900.

The United States has regained the first place as a silver producer. In 1900 it produced 1,793,395 kilograms, fine, with a commercial value of \$35,741,100; next came Mexico, with 1,786,887 kilograms, fine, of a commercial value of \$35,611,400. Together they produce two-thirds of the world's product—about one-third each. No other country approaches them, the nearest being Australasia, with 415,000 kilograms; Bolivia, with 310,000 kilograms, and Peru, with 227,000 kilograms. Of European silver-producing countries Germany deserves notice, with 168,000 kilograms. The four countries named produced together somewhat over one-fifth of the world's production, leaving about one-eighth to all other countries of the world.

Geographically the world's output of silver in 1900 was distributed as follows:

Continent.	Weight.	Commercial value.	Per cent.
	<i>Kilograms.</i>		
Americas (North, Central, and South).....	4,477,000	\$89,200,000	83
Europe	427,000	8,500,000	8
Australasia	415,000	8,300,000	8
Asia	58,000	1,200,000	1
Total	5,377,000	107,200,000	100

The percentages are identical with those obtained for the production of 1899.

This table shows that silver is to-day substantially an American product, five-sixths of all silver produced in 1899 having come from North, Central, and South America. Europe and Australia produced 8 per cent each. Africa produced no silver. The total silver product of Asia is unknown. All silver produced in China stays at home and does not figure in the world's market.

The silver product of the United States in any given calendar year is estimated in precisely the same manner as the gold product, namely, by making two independent calculations of the same and taking their mean as the actual product.

APPROXIMATE SILVER PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1900.

Items reported for 1900.	Fine ounces.
Domestic product in fine silver bars reported by private refineries	57,067,890
Unrefined silver of domestic production deposited at the mints and assay offices	404,676
Domestic silver contained in ores, copper matte, etc., exported for reduction.....	831,863
Total	58,304,429

The second calculation, or disposition of the silver yield of the mines of the United States in the calendar year 1900, is as follows:

APPROXIMATE DISPOSITION OF THE SILVER PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1900.

Disposition.	Fine ounces.
Bullion deposited at the mints and assay offices classified as of domestic production...	3,628,151
Domestic bullion, other than United States mint or assay office bars, exported from the United States as per custom-house returns	95,059,783
Domestic silver in ores, copper matte, etc., exported.....	831,863
Bullion of domestic production reported by private refineries in the United States as having been made into bars for manufacturers and jewelers, for use in the industrial arts.....	7,116,523
Total	106,636,320
Deduct decrease in the approximate stock of silver bars, exclusive of any bars bearing the stamp of a United States mint or assay office in the United States, held by the Mercantile Safe Deposit Company and other institutions at the close of the calendar year 1900, according to information furnished the Bureau of the Mint	49,823
Deduct foreign bullion reported to the Bureau of the Mint by private refineries in the United States as contained in their product of fine silver bars deposited at the mints and assay offices, or entered at the custom-houses for exportation as of domestic production but derived from foreign ores.....	49,596,925
	49,646,748
Net total	56,989,572

The average of these results, 57,647,000 ounces fine, of the commercial value of \$35,741,140 and a coining value of \$74,533,495, representing 1,793,395 kilograms, fine, is the estimated yield.

The export figures for this year contain for the first time the fine weight of silver bullion as reported by the shippers, whereas in former years the invoiced values alone were reported, from which the fine weight was calculated upon the average London quotation for the year. This ought to insure greater accuracy of results. A comparison of the figures for this and the preceding year fails to disclose, however, any material difference in the degree of approximation of the estimated output. The difference between the two estimates for 1900 amounts to 1,314,857 ounces, whereas for 1899 it was 1,462,001 ounces, being 2.3 per cent of the total for 1900 and 2.7 per cent for 1899. This shows that the calculations made in former years at this Bureau secured practically as good results as could be obtained from customs returns. The divergence is apparently due to the preponderance of export figures in the second calculation, as well as to the prominent part of silver imports in the total product, operated upon by private refineries.

Now, it is a familiar fact that statistics of imports and exports between any two given nations can not be made to agree. In the present case, moreover, the exports of 1900 must needs contain a part of the product of 1899, and some part of the foreign bullion contained in the silver bars deposited at the mints and assay offices in the course of the calendar year 1900 must have been on hand at the refineries on the 1st of January, 1900, and thus belongs to the product of 1899. A possible error of less than 3 per cent is inevitable under the circumstances.

The production of silver in the United States has been steadily increasing within the last four years, as seen from the following table:

Year:	Fine ounces.
1897.....	53,860,000
1898.....	54,438,000
1899.....	54,764,000
1900.....	57,647,000

The increase in 1900 was the largest in years, amounting to 2,882,500 fine ounces. This result is due to a revival of silver mining in Idaho, Utah, Arizona, Nevada, and South Dakota, the relative increases in these States being as follows:

	Per cent.
South Dakota.....	268
Arizona.....	90
Idaho.....	67
Nevada.....	61
Utah.....	30

While these increases were to a great extent offset by decreases in Colorado and Montana, yet relatively the production of these two States was but little affected, the decrease amounting to 9.6 per cent in Colorado and 11.8 per cent in Montana.

Details of the silver production of the United States are found in the following table:

TABLE SHOWING THE PRODUCT OF SILVER IN THE SEVERAL STATES AND TERRITORIES IN 1899 AND 1900 AND THE INCREASE OR DECREASE OF THE PRODUCTION OF EACH IN THE LATTER YEAR.

State or Territory.	Weight.			
	1899.	1900.	Increase.	Decrease.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
Alabama.....	100	100	.....	.....
Alaska.....	140,100	73,300	.....	66,800
Arizona.....	1,578,300	2,995,500	1,417,200	.....
California.....	824,300	941,400	117,100	.....
Colorado.....	22,662,900	20,483,900	.....	2,179,000
Georgia.....	400	400	.....	.....
Idaho.....	3,851,800	6,429,100	2,577,300	.....
Michigan.....	112,800	102,000	.....	10,800
Montana.....	16,096,000	14,195,400	.....	1,900,600
Nevada.....	843,400	1,358,700	515,300	.....
New Mexico.....	503,300	434,300	.....	69,000
North Carolina.....	300	11,200	10,900	.....
Oregon.....	134,300	115,400	.....	18,900
South Carolina.....	400	400	.....	.....
South Dakota.....	145,600	536,200	390,600	.....
Texas.....	520,000	477,400	.....	42,600
Utah.....	7,093,300	9,267,600	2,174,300	.....
Washington.....	256,000	224,500	.....	31,500
Wyoming.....	400	200	.....	200
Maryland.....	100	.....	.....	100
Virginia.....	100	.....	.....	100
Maine.....	500	.....	.....	500
Missouri.....	100	.....	.....	100
Total.....	54,764,500	57,647,000	7,202,700	4,320,200
Net increase.....	.....	.....	2,882,500	.....

In addition to the above sources of information this Bureau has, for a number of years, been collecting statistics of mining production through special agents located in the several States and Territories. The following table is a summary of their reports, which are appended in another part of the present report:

PRODUCT OF GOLD AND SILVER IN THE INDIVIDUAL STATES AND TERRITORIES, REPORTED BY MINT OFFICERS AND AGENTS, FOR THE CALENDAR YEAR 1900.

State or Territory.	Gold.		Silver.			Total value (commercial value, silver).
	Fine ounces.	Value.	Fine ounces.	Coining value.	Commercial value.	
Alabama.....	127	\$2,618	50	\$65	\$31	\$2,649
Alaska.....	395,039	8,166,187	74,818	96,735	46,387	8,212,574
Arizona.....	205,594	4,250,000	4,250,000	5,494,949	2,635,000	6,885,000
California.....	767,390	15,863,355	1,168,157	1,510,344	724,257	16,587,612
Colorado.....	1,396,557	28,869,392	20,881,983	26,998,928	12,946,829	41,816,221
Georgia.....	6,024	124,528	489	632	303	124,831
Idaho.....	100,525	2,078,036	6,550,118	8,468,839	4,061,073	6,139,109
Maryland.....	19	392	2	2	1	393
Michigan.....	1,401	28,961	102,042	131,933	63,266	92,227
Montana.....	229,115	4,736,225	14,294,835	18,482,211	8,862,798	13,599,023
Nevada.....	97,901	2,023,803	1,493,566	1,931,075	926,011	2,949,814
New Mexico.....	42,768	884,088	529,619	684,760	328,364	1,212,452
North Carolina.....	2,160	44,653	12,364	15,986	7,666	52,319
Oregon.....	83,587	1,727,892	132,042	170,721	81,866	1,809,758
South Carolina.....	5,934	122,657	391	506	242	122,899
South Dakota.....	300,955	6,221,288	558,903	722,622	346,520	6,567,808
Tennessee.....	15	310	1	1	1	311
Texas.....	53	1,096	477,400	617,244	295,988	297,084
Utah.....	195,223	4,035,610	9,381,684	12,129,854	5,816,644	9,852,254
Virginia.....	172	3,558	96	124	57	3,615
Washington.....	35,432	732,437	302,570	391,201	187,593	920,030
Wyoming.....	1,653	84,171	256	331	159	84,330
Total.....	3,867,644	79,951,257	60,211,386	77,849,063	37,331,056	117,282,313

The total product of the precious metals reported by mint officers and agents in the foregoing table somewhat exceeds either of the above calculations of this Bureau, the difference between this total and the lower of the two estimates being 1.06 per cent for gold and 5.65 per cent for silver. A difference between the two sets of figures is naturally to be expected, inasmuch as they do not relate to the same thing, the figures reported by mint officers and agents representing the estimated fine contents of the ore, whereas the estimates of this Bureau deal with the finished product only. That the calculations of this Bureau, nevertheless, approximate very closely the results obtained from the mines by mint officers and agents in the several States and Territories vouches for the practical accuracy of the estimates.

The following table gives the weight and value of the finished product, by States, as estimated at this Bureau:

APPROXIMATE DISTRIBUTION BY PRODUCING STATES AND TERRITORIES OF THE PRODUCT OF GOLD AND SILVER IN THE UNITED STATES FOR THE CALENDAR YEAR 1900.

[As estimated by the Director of the Mint.]

State or Territory.	Gold.		Silver.			Total value (silver at commercial value).
	Fine ounces.	Value.	Fine ounces.	Coining value.	Commercial value.	
Alabama.....	92	\$1,900	100	\$129	\$62	\$1,962
Alaska.....	395,271	8,171,000	73,300	94,772	45,446	8,216,446
Arizona.....	202,856	4,193,400	2,995,500	3,872,970	1,857,210	6,050,610
California.....	765,109	15,816,200	941,400	1,217,165	583,668	16,399,868
Colorado.....	1,394,622	28,829,400	20,483,900	26,484,234	12,700,018	41,529,418
Georgia.....	5,644	116,700	400	517	248	116,948
Idaho.....	83,433	1,724,700	6,429,100	8,312,372	3,986,042	5,710,742
Maryland.....	5	100				100
Michigan.....	1,403	29,000	102,000	131,879	63,240	92,240
Missouri.....	33	700				700
Montana.....	227,266	4,698,000	14,195,400	18,353,648	8,801,148	13,499,148
Nevada.....	97,050	2,006,200	1,358,700	1,756,703	842,394	2,848,594
New Mexico.....	40,292	832,900	434,300	561,519	269,266	1,102,166
North Carolina.....	1,379	28,500	11,200	14,481	6,944	35,444
Oregon.....	81,980	1,694,700	115,400	149,204	71,548	1,766,248
South Carolina.....	5,854	121,000	400	517	248	121,248
South Dakota.....	298,842	6,177,600	536,200	693,269	332,444	6,510,044
Tennessee.....	5	100				100
Texas.....	53	1,100	477,400	617,244	295,988	297,088
Utah.....	192,155	3,972,200	9,267,600	11,982,351	5,745,912	9,718,112
Virginia.....	155	3,200				3,200
Washington.....	34,743	718,200	224,500	290,263	139,190	857,390
Wyoming.....	1,655	34,200	200	258	124	34,324
Total.....	3,829,897	79,171,000	57,647,000	74,533,495	35,741,140	114,912,140

The sources of the production of gold and silver in the United States, compiled from the reports made by mint officers and agents, are given in the following table:

DISTRIBUTION OF THE GOLD AND SILVER PRODUCT OF THE UNITED STATES FOR THE CALENDAR YEAR 1900 AS TO SOURCES OF PRODUCTION.

[As reported by mint officers and agents.]

State or Territory.	Gold.		Silver.		
	Quartz.	Placer.	Quartz.	Lead ores.	Copper ores.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
Alabama.....	62	65	50		
Alaska.....	101,095	293,944	74,818		
Arizona.....	196,494	9,100	2,571,977	225,732	1,452,291
California.....	607,485	159,905	614,412	54,713	499,032

DISTRIBUTION OF THE GOLD AND SILVER PRODUCT OF THE UNITED STATES FOR THE CALENDAR YEAR 1900 AS TO SOURCES OF PRODUCTION—Continued.

State or Territory.	Gold.		Silver.		
	Quartz.	Placer.	Quartz.	Lead ores,	Copper ores.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
Colorado	1,361,643	34,914	4,802,856	^a 16,079,127	.....
Georgia	4,535	1,489	489	.....	.....
Idaho.....	56,804	43,721	1,021,153	5,528,965	.....
Maryland.....	10	9	2	.....	.....
Michigan.....	1,401	.....	.....	.....	102,042
Montana.....	202,406	26,709	2,835,948	2,134,802	9,324,085
Nevada.....	96,911	990	1,125,000	368,566	.....
New Mexico.....	39,140	3,628	139,619	90,000	300,000
North Carolina.....	888	1,272	12,364	.....	.....
Oregon.....	68,319	15,268	79,668	52,374	.....
South Carolina.....	5,628	306	391	.....	.....
South Dakota.....	300,955	.....	558,903	.....	.....
Tennessee.....	.....	15	1	.....	.....
Texas.....	53	.....	477,400	.....	.....
Utah.....	195,223	.....	2,027,038	5,912,184	1,442,462
Virginia.....	78	94	96	.....	.....
Washington.....	30,664	4,768	154,270	146,300	2,000
Wyoming.....	.....	1,653	256	.....	.....
Total	3,269,794	597,850	16,496,711	30,592,763	13,121,912

^a Lead and copper ores.

As seen from the foregoing table, Alaska furnishes nearly one-half of all the placer gold and California more than one-fourth; nearly three-fourths of Alaska gold is placer gold; placer mining is of considerable relative importance in Idaho. On the whole, however, quartz mining predominates in the United States.

With regard to silver, on the contrary, quartz mining occupies, on the whole, the second place. Of the main silver-producing States and Territories, only Arizona, Nevada, and California show preponderance of quartz mining; copper mining as a source of silver production predominates only in Montana.

On the whole, the first place is held by the product from lead ores. In the table next below the results of the year 1900 are compared with former years; as seen from this table, the distribution of the silver product among the several sources of production remained in 1900 practically stationary:

Source.	1891.	1897.	1898.	1899.	1900.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Quartz mills.....	49.2	21.8	24.7	28.0	27.4
Lead bullion.....	40.6	57.5	56.2	51.1	50.8
Copper bullion.....	10.2	20.7	19.1	20.9	21.8
Total	100	100	100	100	100

The annual production of gold and silver from the mines of the United States since 1860 is shown in the following table:

(The commercial value of the silver product is reckoned at the average yearly market price of silver and its coining value in United States dollars.)

PRODUCT OF GOLD AND SILVER FROM MINES IN THE UNITED STATES SINCE 1860.

[The estimate for 1860-1872 is by R. W. Raymond, commissioner, and since 1872 by the Bureau of the Mint.]

Calendar year.	Gold.		Silver.		
	Fine ounces.	Value.	Fine ounces.	Commercial value.	Coining value.
1860.....	2,225,250	\$46,000,000	116,015	\$157,000	\$150,000
1861.....	2,080,125	43,000,000	1,546,875	2,062,000	2,000,000
1862.....	1,896,300	39,200,000	3,480,469	4,685,000	4,500,000
1863.....	1,935,000	40,000,000	6,574,219	8,842,000	8,500,000
1864.....	2,230,088	46,100,000	8,507,812	11,443,000	11,000,000
1865.....	2,574,759	53,225,000	8,701,171	11,642,000	11,250,000
1866.....	2,588,063	53,500,000	7,734,375	10,356,000	10,000,000
1867.....	2,502,197	51,725,000	10,441,406	13,866,000	13,500,000
1868.....	2,322,000	48,000,000	9,281,250	12,307,000	12,000,000
1869.....	2,394,563	49,500,000	9,281,250	12,298,000	12,000,000
1870.....	2,418,750	50,000,000	12,375,000	16,734,000	16,000,000
1871.....	2,104,313	43,500,000	17,789,062	23,578,000	23,000,000
1872.....	1,741,500	36,000,000	22,236,328	29,396,000	28,750,000
Total	29,012,908	599,750,000	118,065,232	157,366,000	152,650,000
1873.....	1,741,500	36,000,000	27,650,000	35,890,000	35,750,000
1874.....	1,620,563	33,500,000	28,849,000	36,869,000	37,300,000
1875.....	1,615,725	33,400,000	24,518,000	30,549,000	31,700,000
1876.....	1,930,162	39,900,000	30,009,000	34,690,000	38,800,000
1877.....	2,268,788	46,900,000	30,783,000	36,970,000	39,800,000
1878.....	2,476,800	51,200,000	34,960,000	40,270,000	45,200,000
1879.....	1,881,787	38,900,000	31,550,000	35,430,000	40,800,000
1880.....	1,741,500	36,000,000	30,320,000	34,720,000	39,200,000
1881.....	1,678,612	34,700,000	33,260,000	37,850,000	43,000,000
1882.....	1,572,187	32,500,000	36,200,000	41,120,000	46,800,000
1883.....	1,451,250	30,000,000	35,730,000	39,660,000	46,200,000
1884.....	1,489,950	30,800,000	37,800,000	42,070,000	48,800,000
1885.....	1,538,325	31,800,000	39,910,000	42,500,000	51,600,000
1886.....	1,693,125	35,000,000	39,440,000	39,230,000	51,000,000
1887.....	1,596,375	33,000,000	41,260,000	40,410,000	53,350,000
1888.....	1,604,841	33,175,000	45,780,000	43,020,000	59,195,000
1889.....	1,587,000	32,800,000	50,000,000	46,750,000	64,646,000
1890.....	1,588,880	32,845,000	54,500,000	57,225,000	70,465,000
1891.....	1,604,841	33,175,000	58,330,000	57,630,000	75,417,000
1892.....	1,596,375	33,000,000	63,500,000	55,563,000	82,101,000
1893.....	1,739,323	35,955,000	60,000,000	46,800,000	77,576,000
1894.....	1,910,813	39,500,000	49,500,000	31,422,000	64,000,000
1895.....	2,254,760	46,610,000	55,727,000	36,445,000	72,051,000
1896.....	2,568,132	53,088,000	58,835,000	39,655,000	76,069,000
1897.....	2,774,935	57,363,000	53,860,000	32,316,000	69,637,000
1898.....	3,118,398	64,463,000	54,438,000	32,118,000	70,384,000
1899.....	3,437,210	71,053,000	54,764,000	32,859,000	70,806,000
1900.....	3,829,897	79,171,000	57,647,000	35,741,000	74,533,000
Total	55,912,054	1,155,798,000	1,219,120,000	1,115,772,000	1,576,180,000
Grand total.....	84,924,962	1,755,548,000	1,337,185,232	1,273,138,000	1,728,830,000

Tables showing the product of gold and silver from mines of the United States since 1792 will be found in the Appendix.

DEPOSITS OF GOLD.

The deposits of gold at the mints and assay offices during the calendar year 1900 contained 7,646,165 fine ounces of the value of \$158,060,257, an increase of \$28,261,475 over the value of deposits reported for 1899.

The deposits of domestic bullion contained 4,579,960 fine ounces, of the value of \$94,676,174.

For convenience of the Bureau the domestic bullion has been classified as unrefined, refinery bars, and refined bullion; unrefined being bullion received direct from the miners in its crude state, refinery bars (less than 0.992 in fineness) and refined bars (0.992 and over in

fineness) being the product of certain smelters, refineries, cyanide, and chlorination works deposited at the mints and assay offices.

The deposits and transfers of mutilated and uncurrent domestic gold coin amounted to 63,902 fine ounces of the value of \$1,270,982, of which amount \$731,549 were received from the Treasury and \$589,433 were deposited at the mints by private individuals.

The deposits of foreign gold bullion contained 1,293,704 fine ounces of the value of \$26,743,237, of which \$23,769,919 represents the value of deposits of unrefined and \$2,973,318 value of refined bullion reported to have been received from the countries named in the following statement:

DEPOSITS OF FOREIGN GOLD BULLION.

Country of production.	Fine ounces.	Value.
UNREFINED.		
British Columbia	76,991	\$1,591,545
Northwest Territory	858,573	17,748,279
Ontario and Quebec	25,403	525,126
Nova Scotia	29,444	608,662
Manitoba	157	3,246
Winnipeg	52	1,075
Ottawa	28	579
Canada—unknown locality	175	3,617
Mexico	106,547	2,202,522
Cuba	28	579
Porto Rico	242	5,002
Santo Domingo	98	2,026
Central America	24,088	497,943
South America	15,889	328,455
Japan	186	3,845
China	30	620
Korea	134	2,770
Syria	5	102
South Africa	32	661
Philippine Islands	12	248
Unknown	11,756	243,017
Total	1,149,870	23,769,919
REFINED.		
England	143,834	2,973,318

The deposits of foreign gold coin received and melted at the mints and assay offices contained 1,523,950 fine ounces, of the value of \$31,502,833, as shown by the following table:

Country of coinage.	Fine ounces.	Value.
Great Britain	826,597	\$17,087,276
Germany	12,652	261,540
Japan	341,631	7,062,138
Mexico	19,049	393,777
Russia	3,159	65,302
Spain	158,061	3,267,410
France	139,739	2,888,661
Haiti	6	123
Turkey	12	248
Central America	571	11,803
South America	98	2,025
Other	6	123
Unknown	22,369	462,407
Total	1,523,950	31,502,833

The deposits of old jewelry contained 184,649 fine ounces, of the value of \$3,817,031.

REDEPOSITS OF GOLD.

The redeposits of gold bullion at the mints and assay offices contained 4,005,478 fine ounces, of the value of \$82,800,590, as shown by the following table:

Institution at which manufactured.	UNPARTED GOLD BARS.							
	Institutions at which redeposited.							Total.
	Philadel- phia.	San Fran- cisco.	Denver.	Boise.	Helena.	St.Louis.	Seattle.	
	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>
Philadelphia.....	7							7
San Francisco		156						156
Carson		9,183						9,183
Denver	624,915		83					624,998
Boise	77,267			2,651				79,918
Helena.....	102,319				41			102,360
Charlotte	11,194							11,194
St. Louis	5,534					38		5,572
Deadwood	11,779							11,779
Seattle	291	1,052,698					38	1,053,027
Total.....	833,306	1,062,037	83	2,651	41	38	38	1,898,194

Institution at which manufactured.	UNPARTED GOLD BARS.				
	Institutions at which redeposited.				
	Fine gold bars.				Mint bars.
	Philadel- phia.	New Or- leans.	New York.	Total.	Philadel- phia.
	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>
New York	1,051,919		161,757	1,213,676	647,399
New Orleans		15		15	
Denver	246,194			246,194	
Total	1,298,113	15	161,757	1,459,885	647,399

The following tables show the deposits and redeposits of gold during the calendar year:

TABLE SHOWING THE WEIGHT OF THE DEPOSITS AND REDEPOSITS OF GOLD BULLION AT MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1899 AND 1900, WITH THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of gold bullion.	Calendar year.		Increase.	Decrease.
	1899.	1900.		
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
Domestic bullion, unrefined.....	999,503	1,131,926	132,423	
Domestic bullion, refinery bars.....	788,827	884,528	95,701	
Domestic bullion, refined.....	2,161,349	2,563,506	402,157	
Total domestic bullion.....	3,949,679	4,579,960	630,281	
Domestic coin, Treasury transfers.....	16,257	35,388	19,131	
Domestic coin purchased.....	49,972	28,514		41,458
Foreign bullion, unrefined.....	878,672	1,149,870	271,198	
Foreign bullion, refined.....	306,927	143,834		163,093
Foreign coins melted	925,497	1,523,950	598,453	
Jewelers' bars, etc.....	152,012	184,649	34,637	
Total deposits.....	6,279,016	7,646,165	1,553,700	204,551
Redeposits:				
Fine bars.....	1,086,867	1,459,885	373,018	
Mint bars.....	1,507,457	647,399		860,058
Unparted bars.....	1,302,957	1,898,194	595,237	
Total redeposits.....	3,897,281	4,005,478	968,255	860,058
Total gold operated upon.....	10,176,297	11,651,643	2,521,955	1,064,609
Net increase			1,457,346	

TABLE SHOWING THE VALUE OF THE DEPOSITS AND REDEPOSITS OF GOLD BULLION AT THE MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1899 AND 1900, WITH THE INCREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of gold bullion.	Calendar year.		Increase.	Decrease.
	1899.	1900.		
Domestic bullion, unrefined	\$20,661,571	\$23,398,980	\$2,737,409	.....
Domestic bullion, refinery bars	16,306,511	18,284,815	1,978,304	.....
Domestic bullion, refined	44,679,040	52,992,379	8,313,339	.....
Total domestic bullion.....	81,647,1 ²	94,676,174	13,029,052	.....
Domestic coin, Treasury transfers	336,054	731,549	395,495	.....
Domestic coin purchased	1,033,025	589,433	.....	\$443,592
Foreign bullion, unrefined	18,163,768	23,769,919	5,606,151	.....
Foreign bullion, refined	6,344,746	2,973,318	.....	3,371,428
Foreign coins, melted.....	19,131,710	31,502,833	12,371,123	.....
Jewelers' bars, etc	3,142,357	3,817,031	674,674	.....
Total deposits.....	129,798,782	158,060,257	32,076,495	3,815,020
Redeposits:				
Fine bars	22,467,528	30,178,512	7,710,984	.....
Mint bars	31,161,908	13,382,934	.....	17,778,974
Unparted bars	26,934,505	39,239,144	12,304,639	.....
Total redeposits.....	80,563,941	82,800,590	20,015,623	17,778,974
Total gold operated upon.....	210,362,723	240,860,847	52,092,118	21,593,994
Net increase .....	.....	.....	30,498,124	.....

DEPOSITS OF SILVER.

Silver is coined in the United States on Government account only. Deposits of silver bullion are received by the mints and assay offices of the United States for return to the depositor in fine or unparted bars with the weight and fineness stamped thereon. The deposits of silver for return in fine bars are confined almost exclusively to the New York assay office, only a small amount being deposited at other institutions. Fine silver bars manufactured for depositors are either exported or sold for use in the industrial arts in the United States.

The deposits of silver at the mints and assay offices during the calendar year 1900 were 12,379,351 fine ounces, of the coining value of \$16,005,625, and the redeposits contained 20,781,893 fine ounces, of the coining value of \$26,869,519.

The domestic bullion amounted to 3,628,151 fine ounces, of the coining value of \$4,690,943. For the convenience of the Bureau the domestic silver bullion has been classified as unrefined, refinery bars, and refined bars, similar to domestic gold bullion.

The deposits and transfers of mutilated and uncurrent domestic silver coin amounted to 2,615,173 fine ounces, of the coining value of \$3,381,233, of which 2,612,289 fine ounces were received from the Treasury and 2,884 fine ounces purchased over the counter.

Foreign silver bullion amounted to 1,374,911 fine ounces, of the value of \$1,777,662, representing the deposits of unrefined bullion reported to have been received from countries named in the following statement:

DEPOSITS OF FOREIGN SILVER BULLION.

Country of production.	Fine ounces.	Coinage value.
British Columbia	23,137	\$29,915
Northwest Territory	211,653	273,652
Ontario and Quebec	7,182	9,286
Nova Scotia.....	1,014	1,311
Manitoba	27	35
Winnipeg.....	11	14
Ottawa.....	4	5
Canada (unknown locality)	32	42
Mexico	1,105,410	1,429,217
Cuba	10	13
Porto Rico	49	63
Santo Domingo	7	9
Central America	18,714	24,196
South America	6,351	8,211
Japan	15	19
China	1	1
Korea.....	67	87
South Africa.....	4	5
Philippine Islands.....	3	4
Unknown.....	1,220	1,577
Total.....	1,374,911	1,777,662

The deposits of foreign silver coin received and melted contained 4,191,915 fine ounces, of the coining value of \$5,419,849, as shown by the following table:

Country of coinage.	Fine ounces.	Coining value.
Porto Rico	4,070,133	\$5,262,394
Spain	514	664
Santo Domingo	2,883	3,727
Haiti.....	4,250	5,495
Costa Rica	60,442	78,148
South America.....	32,945	42,596
Unknown.....	20,748	26,825
Total.....	4,191,915	5,419,849

The deposits of old jewelry contained 569,201 fine ounces, of the value of \$735,937.

REDEPOSITS OF SILVER.

The redeposits of silver bullion at the mints and assay offices contained 20,781,893 fine ounces, of the coining value of \$26,869,519, of which 19,994,395 fine ounces were in fine bars, 412,883 fine ounces in standard bars, 374,615 fine ounces in unparted bars, as shown by the following statements:

UNPARTED SILVER BARS.

Institution at which manufactured.	Institution at which redeposited.							
	Philadel- phia.	San Fran- cisco.	St. Louis.	Denver.	Boise.	Helena.	Seattle.	Total.
	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>
Philadelphia.....	7							7
San Francisco.....		44						44
Carson		5,163						5,163
Denver	70,030			32				70,062
Helena.....	32,884					5		32,889
Boise.....	25,757				564			26,321
Charlotte	975							975
St. Louis	720		9					729
Seattle	32	235,797					34	235,863
Deadwood	2,562							2,562
Total.....	132,967	241,004	9	32	564	5	34	374,615

FINE AND STANDARD SILVER BARS.

Institution at which manufactured.	Institution at which redeposited.				
	Fine bars.				Standard bars.
	Philadel- phia.	San Francisco.	New Orleans.	New York.	New Orleans.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
Philadelphia	428	3,669,327	16,016,804	.....	.....
San Francisco .....	.....	176,183	.....	.....	.....
New York .....	.....	.....	128,507	3,146	412,883
Total	428	3,845,510	16,145,311	3,146	412,883

The following tables show the deposits and redeposits of silver during the calendar year:

TABLE SHOWING THE WEIGHT OF THE DEPOSITS AND REDEPOSITS OF SILVER BULLION AT THE MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1899 AND 1900, WITH THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of silver bullion.	Calendar year.		Increase.	Decrease.
	1899.	1900.		
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
Domestic bullion, unrefined	372,741	404,675	31,934	.....
Domestic bullion, refinery bars	70,885	87,066	16,181	.....
Domestic bullion, refined	4,894,718	3,136,410	.....	1,758,308
Total domestic bullion	5,338,344	3,628,151	48,115	1,758,308
Domestic coin, Treasury transfers	3,749,229	2,612,289	.....	1,136,940
Domestic coin purchased	2,856	2,709	.....	147
Trade dollars purchased	214	175	.....	39
Foreign bullion, unrefined	771,757	1,374,911	603,154	.....
Foreign bullion, refined	3,882	.....	.....	3,882
Foreign coins melted	38,376	4,191,915	4,153,539	.....
Jewelers' bars, etc	522,770	569,201	46,431	.....
Total deposits	10,427,428	12,379,351	4,851,239	2,899,316
Redeposits:				
Fine bars	15,237,648	19,994,395	4,756,747	.....
Mint bars	14,523	.....	.....	14,523
Standard bars	88,751	412,883	324,132	.....
Unparted bars	288,977	374,615	85,638	.....
Total redeposits	15,629,899	20,781,893	5,166,517	14,523
Total silver operated upon	26,057,327	33,161,244	10,017,756	2,913,839
Net increase .....	.....	.....	7,103,917	.....

TABLE SHOWING THE VALUE OF THE DEPOSITS AND REDEPOSITS OF SILVER BULLION AT THE MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1899 AND 1900, WITH THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of silver bullion.	Calendar year.		Increase.	Decrease.
	1899.	1900.		
Domestic bullion, unrefined	\$481,928	\$523,217	\$41,289	.....
Domestic bullion, refinery bars	91,649	112,571	20,922	.....
Domestic bullion, refined	6,328,524	4,055,155	.....	\$2,273,369
Total domestic bullion	6,902,101	4,690,943	62,211	2,273,369
Domestic coin, Treasury transfers	4,847,488	3,377,504	.....	1,469,984
Domestic coin, purchases	3,698	3,502	.....	196
Trade dollars purchased	272	227	.....	45
Foreign bullion, unrefined	997,827	1,777,663	779,836	.....
Foreign bullion, refined	5,019	.....	.....	5,019
Foreign coins melted	49,617	5,419,849	5,370,232	.....
Jewelers' bars, etc	675,905	735,937	60,032	.....
Total deposits	13,481,927	16,005,625	6,272,311	3,748,613

TABLE SHOWING THE VALUE OF THE DEPOSITS AND REDEPOSITS OF SILVER BULLION AT THE MINTS AND ASSAY OFFICES OF THE UNITED STATES, ETC.—Continued.

Classification of deposits of silver bullion.	Calendar year.		Increase.	Decrease.
	1899.	1900.		
Redeposits:				
Fine bars.....	\$19,701,201	\$25,851,340	\$6,150,139	.....
Mint bars.....	18,777	.....	.....	\$18,777
Standard bars.....	114,749	533,828	419,079	.....
Unparted bars.....	373,627	484,351	110,724	.....
Total redeposits.....	20,208,354	26,869,519	6,679,942	18,777
Total silver operated upon.....	33,690,281	42,875,144	12,352,253	3,767,390
Net increase.....	.....	.....	9,184,863	.....

DEPOSITS OF GOLD AND SILVER SINCE 1880.

The following table shows the amount of gold and silver received at the mints and assay offices by calendar years since 1880:

GOLD AND SILVER (EXCLUDING REDEPOSITS) RECEIVED AT THE MINTS AND ASSAY OFFICES DURING THE CALENDAR YEARS SINCE 1880.

Calendar year.	Gold.	Silver (coin- ing value).	Total.
1880.....	\$100,278,703	\$35,103,825	\$135,382,528
1881.....	98,763,426	30,326,848	129,090,274
1882.....	41,921,263	35,161,254	77,082,517
1883.....	51,089,456	36,978,184	88,067,640
1884.....	50,518,179	36,670,731	87,188,910
1885.....	44,714,052	35,836,725	80,550,777
1886.....	66,422,088	39,086,070	105,508,158
1887.....	74,724,077	46,381,333	121,105,410
1888.....	41,496,410	41,323,973	82,820,383
1889.....	42,599,206	41,977,265	84,576,471
1890.....	48,767,964	55,198,037	103,966,001
1891.....	60,849,552	70,994,120	131,843,672
1892.....	45,406,646	84,591,898	129,998,544
1893.....	69,419,223	62,465,005	131,884,228
1894.....	49,704,902	14,120,605	63,825,507
1895.....	69,433,579	13,843,636	83,277,215
1896.....	91,743,670	10,873,160	102,616,830
1897.....	87,924,232	12,707,128	100,631,360
1898.....	182,996,602	15,841,222	198,837,824
1899.....	129,798,782	13,481,927	143,280,511
1900.....	158,060,258	16,005,626	174,065,884

COINAGE OF THE UNITED STATES.

The following table exhibits the number of fine ounces and value of gold and silver coinage of the United States, by calendar years, since 1873:

COINAGE OF GOLD AND SILVER OF THE MINTS OF THE UNITED STATES SINCE 1873.

Calendar year.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
1873.....	2,758,475	\$57,022,748	3,112,891	\$4,024,748
1874.....	1,705,441	35,254,630	5,299,421	6,851,777
1875.....	1,594,050	32,951,940	11,870,635	15,347,893
1876.....	2,253,281	46,579,453	18,951,777	24,503,308
1877.....	2,128,493	43,999,864	21,960,246	28,393,045
1878.....	2,408,400	49,786,052	22,057,548	28,518,850
1879.....	1,890,499	39,080,080	21,323,498	27,569,776
1880.....	3,014,163	62,308,279	21,201,232	27,411,694
1881.....	4,685,162	96,850,890	21,609,970	27,940,164
1882.....	3,187,317	65,887,685	21,635,469	27,973,132

COINAGE OF GOLD AND SILVER OF THE MINTS OF THE UNITED STATES, ETC.—Continued.

Calendar year.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value,
1883	1,414,581	\$29,241,990	22,620,701	\$29,246,968
1884	1,160,601	23,991,756	22,069,935	28,534,866
1885	1,343,519	27,773,012	22,400,433	28,962,176
1886	1,400,240	28,945,542	24,817,064	32,086,709
1887	1,159,664	23,972,383	27,218,101	35,191,081
1888	1,518,046	31,380,808	25,543,242	33,025,606
1889	1,035,899	21,413,931	27,454,465	35,496,683
1890	990,100	20,467,182	30,320,999	39,202,908
1891	1,413,614	29,222,005	21,284,115	27,518,857
1892	1,682,832	34,787,223	9,777,084	12,641,078
1893	2,757,231	56,997,020	6,808,413	8,802,797
1894	3,848,045	79,546,160	7,115,896	9,200,351
1895	2,883,941	59,616,358	4,407,055	5,698,010
1896	2,276,192	47,053,060	17,858,594	23,089,899
1897	3,677,878	76,028,485	14,298,769	18,487,297
1898	3,772,561	77,985,757	17,815,385	23,034,033
1899	5,386,277	111,344,220	20,156,957	26,061,520
1900	4,802,328	99,272,942	28,072,162	36,295,321
Total.....	68,148,830	1,408,761,455	519,062,057	671,110,547

In the Appendix a table will be found showing the value of the coinage executed by each mint annually since 1792.

The following table shows the number of pieces and value of coinage executed at the mints of the United States during the calendar year 1900:

COINAGE EXECUTED IN THE UNITED STATES, CALENDAR YEAR 1900.

Description.	Pieces.	Value.
Gold.....	6,510,979	\$99,272,942.50
Silver dollars.....	25,010,912	25,010,912.00
Subsidiary silver coin	50,137,913	11,334,409.45
Minor coin	94,089,759	2,031,137.39
Total	175,749,563	137,649,401.34

There are included 50,000 Lafayette souvenir dollars coined under act of March 3, 1899, in the amount of silver dollars coined reported in the above table.

COINAGE FOR COSTA RICA.

In addition to the domestic coinage there were manufactured for the Government of Costa Rica the following gold coins:

Denomination.	Pieces.
Twenty-colone pieces	5,000
Ten-colone pieces	140,000
Five-colone pieces.....	100,000
Two-colone pieces.....	125,000
Total	370,000

The above coinage for Costa Rica represents the value of \$1,047,041.40.

BARS MANUFACTURED, 1900.

The following statements show the character and value of gold and silver bars manufactured during the calendar year 1900:

Description.	Gold.	Silver.
Fine bars	\$62, 182, 183. 37	\$6, 702, 875. 45
Mint bars.....	6, 589, 043. 70	91, 609. 49
Standard bars.....	3, 443, 972. 58	3, 160. 15
Unparted bars	38, 874, 850. 51	494, 409. 30
Total.....	111, 090, 050. 16	7, 292, 054. 39

PURCHASE OF SILVER.

The repeal of the purchasing clause of the act of July 14, 1890, by act of November 1, 1893, limited the purchase of silver to that contained in deposits of gold bullion, silver fractions for return in fine bars, the amount retained in payment for charges on silver deposits, surplus bullion returned by the operative officers on the annual settlement at the close of the fiscal year, and uncurrent and mutilated domestic coins purchased under provisions of section 3526 of the Revised Statutes for the subsidiary silver coinage.

The following tables show the quantity and cost of silver purchased for the subsidiary coinage during the calendar year 1900:

SILVER PURCHASED AT THE MINTS FOR SUBSIDIARY COINAGE DURING THE CALENDAR YEAR 1900.

Stock.	Standard ounces.	Cost.
Amount Porto Rican coins redeemed and melted	4, 522, 370. 39	\$3, 419, 521. 08
Partings, charges, and fractions purchased.....	540, 847. 31	296, 570. 35
Melted assay coins purchased.....	828. 03	989. 26
Mutilated coins purchased.....	2, 150. 77	1, 170. 82
Surplus bullion purchased.....	14, 880. 39	8, 824. 12
Total.....	5, 081, 076. 89	3, 727, 075. 63

TABLE SHOWING THE QUANTITY AND COST OF SILVER PURCHASED AT EACH MINT FOR SUBSIDIARY COINAGE, AND AT THE NEW YORK ASSAY OFFICE, DURING THE CALENDAR YEAR 1900.

Institution.	Standard ounces.	Cost.
Mint at Philadelphia	4, 702, 791. 86	\$3, 518, 846. 20
Mint at San Francisco	328, 275. 06	180, 176. 37
Mint at New Orleans.....	50, 009. 97	28, 053. 06
Assay office at New York	144, 886. 99	80, 815. 59
Total.....	5, 225, 963. 88	3, 807, 891. 22

AMOUNT, COST, AVERAGE PRICE, AND BULLION VALUE OF THE SILVER DOLLAR OF SILVER PURCHASED UNDER THE ACT OF FEBRUARY 28, 1878.

Fiscal year.	Fine ounces.	Cost.	Average price per fine ounce.	Bullion cost of a silver dollar.
1878	10,809,350.58	\$13,023,268.96	\$1.2048	\$0.9318
1879	19,248,086.09	21,593,642.99	1.1218	.8676
1880	22,057,862.64	25,235,081.53	1.1440	.8848
1881	19,709,227.11	22,327,874.75	1.1328	.8761
1882	21,190,200.87	24,054,480.47	1.1351	.8779
1883	22,889,241.24	25,577,327.58	1.1174	.8642
1884	21,922,951.52	24,378,383.91	1.1120	.8600
1885	21,791,171.61	23,747,460.25	1.0897	.8428
1886	22,690,652.94	23,448,960.01	1.0334	.7992
1887	26,490,008.04	25,988,620.46	.9810	.7587
1888	25,386,125.32	24,237,553.20	.9547	.7384
1889	26,468,861.03	24,717,853.81	.9338	.7222
1890	27,820,900.05	26,899,326.33	.9668	.7477
1891	2,797,379.52	3,049,426.46	1.0901	.8431
Total.....	291,272,018.56	308,279,260.71	1.0583	.8185

AMOUNT, COST, AVERAGE PRICE, AND BULLION VALUE OF THE SILVER DOLLAR OF SILVER PURCHASED UNDER ACT OF JULY 14, 1890.

Fiscal year.	Fine ounces.	Cost.	Average price per fine ounce.	Bullion cost of a silver dollar.
1891	48,393,113.05	\$50,577,498.44	\$1.0451	\$0.8083
1892	54,355,748.10	51,106,607.96	.9402	.7271
1893	54,008,162.60	45,531,374.53	.8430	.6520
1894	11,917,658.78	8,715,521.32	.7313	.5656
Total.....	168,674,682.53	155,931,002.25	.9244	.7150

AMOUNT, COST, AVERAGE PRICE, AND BULLION VALUE OF THE SILVER DOLLAR OF SILVER PURCHASED UNDER THE ACTS OF FEBRUARY 12, 1873, JANUARY 14, 1875, FEBRUARY 28, 1878, AND JULY 14, 1890.

Act authorizing.	Fine ounces.	Cost.	Average price per fine ounce.	Bullion cost of a silver dollar.
February 12, 1873.....	5,434,282.00	\$7,152,564.00	\$1.3162	\$1.0180
January 14, 1875.....	31,603,906.70	37,571,148.00	1.1888	.9194
February 28, 1878.....	291,272,018.56	308,279,260.71	1.0583	.8185
July 14, 1890.....	168,674,682.53	155,931,002.25	.9244	.7150
Total.....	496,984,889.09	508,933,974.96	1.0240	.7920

STATEMENT SHOWING THE AMOUNT AND COST OF SILVER BULLION PURCHASED UNDER ACT OF JULY 14, 1890, AND USED IN THE COINAGE OF STANDARD SILVER DOLLARS, WASTED AND SOLD IN SWEEPS, AND NUMBER OF DOLLARS COINED AND SEIGNIORAGE ON SAME FROM AUGUST 13, 1890, TO DECEMBER 31, 1900.

Disposition.	Fine ounces.	Cost.
Total amount purchased and cost of same.....	168,674,682.53	\$155,931,002.25
Used in coinage of standard silver dollars to December 31, 1900.....	98,337,434.77	92,285,571.78
Used in coinage of subsidiary silver to December 31, 1900	7,704,987.81	6,971,099.05
Wasted and sold in sweeps.....	63,570.37	62,535.64
Transferred to subsidiary purchase account.....	.31	.25
Total amount used.....	106,105,993.26	99,319,206.72
Balance on hand December 31, 1900	*62,568,689.27	56,611,795.53
Total.....	168,674,682.53	155,931,002.25

* Includes 1,084,500.79 fine ounces, costing \$981,250.34 in transit between Philadelphia and New Orleans.

STATEMENT SHOWING THE AMOUNT AND COST OF SILVER BULLION PURCHASED UNDER ACT OF JULY 14, 1890, ETC.—Continued.

	Coinage.	Seigniorage.
Standard silver dollars coined to December 31, 1900	\$127, 143, 350.00	\$34, 857, 778.22
Subsidiary silver coined to December 31, 1900.....	10, 651, 443.30	3, 680, 344.25

BALANCE OF SILVER BULLION PURCHASED UNDER ACT OF JULY 14, 1890, ON HAND AT EACH MINT AND THE ASSAY OFFICE AT NEW YORK JANUARY 1, 1901.

Institution.	Fine ounces.	Cost.
Mint at Philadelphia	51, 030, 975.73	\$46, 172, 545.71
Mint at San Francisco	1, 043, 909.43	944, 515.27
Mint at New Orleans	*9, 872, 888.29	8, 932, 933.12
Assay office at New York	620, 915.82	561, 801.43
Total.....	62, 568, 689.27	56, 611, 795.53

*Includes 1,084,500.79 fine ounces, costing \$981,250.34, in transit from the United States Mint at Philadelphia.

IMPORTS AND EXPORTS OF GOLD AND SILVER.

IMPORTS OF GOLD.

The value of gold imported into the United States during the calendar year 1900 was \$66,749,084, against \$51,334,964 for the calendar year 1899, or an increase of \$15,414,120.

The value of gold bullion imported was \$13,658,462, of which amount \$5,972,577 came from Great Britain, \$3,365,481 from Mexico, \$3,313,069 from Canada, \$499,429 from Central American States, \$83,197 from Germany, and the remainder principally from South America.

Foreign gold coin of the value of \$26,934,504 was also imported, of which \$17,082,750 came from Australasia, \$6,944,530 from Japan, \$882,045 from Canada, \$788,562 from France, \$654,135 from Germany, \$325,771 from Great Britain, and the remainder from various countries.

The value of gold contained in ore imported was \$21,045,828, of which \$19,525,135 came from Canada, \$1,448,644 from Mexico, \$69,588 from Great Britain, and the remainder from Hongkong, Chile, and Guatemala.

There were returned to the United States gold coin of the value of \$5,110,290, of which \$2,822,933 came from Canada, \$1,000,000 from France, \$359,140 from Hawaiian Islands, \$246,822 from Great Britain, \$244,151 from Mexico, and the remainder from various countries.

GOLD IMPORTS, CALENDAR YEAR 1900.

Description.	Amount.
Foreign bullion	\$13, 658, 462
Foreign coin.....	26, 934, 504
Gold in ore	21, 045, 828
Total foreign	61, 638, 794
United States coin.....	5, 110, 290
Total imports gold	66, 749, 084

GOLD EXPORTS.

The total value of gold exported from the United States during the calendar year 1900 was \$54,134,623, of which amount \$52,787,523 was domestic and \$1,347,100 foreign gold, against \$45,379,411 exported during the calendar year 1899, showing an increase in the gold exportation of \$8,755,212 over that for the previous year.

The value of United States assay office bars exported was \$5,740, which went to China and Hongkong.

The value of other domestic gold bars exported was \$34,686,247, of which amount \$15,182,481 went to France; \$14,782,320 to Great Britain; \$4,600,709 to Germany; \$17,737 to Canada, and \$3,000 to Mexico.

The value of domestic gold coin exported during the year was \$18,025,610, of which amount \$5,427,086 went to Canada; \$4,152,400 to Great Britain; \$2,498,997 to South America; \$1,900,000 to France; \$1,491,490 to Venezuela, and the remainder to various countries, principally to the West Indies, Central America, Hongkong, and Hawaiian Islands.

The value of gold in domestic ores exported was \$69,926, of which amount \$31,873 went to Great Britain; \$19,280 to Germany, and \$18,773 to Canada.

Foreign gold coin of the value of \$1,346,250 was exported, of which amount \$870,865 went to West Indies; \$246,077 to Canada; \$146,175 to Bermuda, and the remainder to various countries.

Foreign gold bullion to the amount of \$850 was exported to Canada.

GOLD EXPORTS, CALENDAR YEAR 1900.

Description.	Amount.
United States assay office bars.....	\$5, 740
Other bullion	34, 686, 247
United States coin.....	18, 025, 610
Gold in ore, etc.....	69, 926
Total domestic.....	52, 787, 523
Foreign bullion reexported.....	\$850
Foreign coin reexported.....	1, 346, 250
Total foreign.....	1, 347, 100
Total gold exports.....	54, 134, 623

SILVER IMPORTS.

The silver imports into the United States from all sources during the calendar year 1900 aggregated \$40,100,343, against \$30,843,929 imported during the previous year, being an increase of \$9,256,414.

The commercial value of foreign silver bullion imported was \$7,988,799, of which amount \$6,790,901 came from Mexico, \$612,740 from Central America, \$561,395 from South America, and the remainder from various countries.

Silver coins of the United States of the value of \$7,988,799 were returned to the country, of which amount \$118,106 came from Canada, \$39,441 from the West Indies, \$20,393 from Japan, and the remainder from various countries.

Foreign silver ore imported contained \$25,404,378, of which amount \$20,485,127 came from Mexico, \$2,533,711 from Canada, \$2,324,219 from South America, and the remainder from various countries.

SILVER IMPORTS, CALENDAR YEAR 1900.

Description.	Amount.
Foreign bullion	\$7,988,799
Foreign coin	6,521,322
Silver in ore	25,404,378
Total foreign	39,914,499
United States coin	185,844
Total silver imports	40,100,343

SILVER EXPORTS.

The value of silver exported during the calendar year 1900 amounted to \$66,221,658, of which \$59,272,668 represented the exports of domestic and \$6,948,990 that of foreign silver exports.

Domestic bullion amounting to \$58,314,155 was exported, of which \$51,870,790 went to Great Britain, \$2,473,742 to China, \$736,562 to France, \$75,675 to Canada, \$1,192 to British and Dutch Guianas, \$3,105,894 to Hongkong, and \$49,800 to Japan.

The value of silver in domestic ores exported was \$515,755, of which \$473,119 went to Great Britain and \$42,636 to Germany.

There was exported domestic silver coin amounting to \$442,758, of which \$333,545 went to the West Indies, \$59,250 to the Hawaiian Islands, \$48,463 to Canada and \$1,500 to France and Germany.

Foreign silver coin amounting to \$6,948,958 was exported, of which \$5,002,612 went to Hongkong, \$1,563,650 to Great Britain, \$178,607 to Canada, \$81,497 to Central America, \$31,680 to Brazil, \$31,391 to the West Indies, and the remainder to various countries.

Foreign silver bullion valued at \$38 was exported to Canada.

SILVER EXPORTS, CALENDAR YEAR 1900.

Description.	Amount.
Silver bullion	\$58,314,155
United States coin	442,758
Silver in ore	515,755
Total domestic	59,272,668
Foreign bullion reexported	\$38
Foreign coin reexported	6,948,958
Total foreign	6,948,996
Total silver exports	66,221,664

In the Appendix will be found tables exhibiting the imports and exports of the precious metals, by customs districts and by countries, for the calendar year 1900, kindly compiled by the Bureau of Statistics for use in this report.

MOVEMENT OF GOLD FROM THE UNITED STATES.

The superintendent of the United States assay office at New York has kindly prepared the following tables, giving exports of gold through the port of New York during the calendar year 1900:

STATEMENT OF UNITED STATES GOLD COIN AND GOLD BULLION EXPORTED FROM THE PORT OF NEW YORK TO EUROPE DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1900.

Date.	Country.	Amount.	Rate of exchange.
January 3	England.....	\$150,000	\$4. 87
Do.....	Germany.....	2,650	4. 87½
January 5	England.....	3,502,475	4. 87½
January 20	Germany.....	1,700	4. 87
Do.....	England.....	452	4. 87
March 15	do.....	2,271	4. 85½
Do.....	Germany.....	80	4. 85½
April 25	France.....	500,000	4. 88½
May 2	do.....	2,610,994	4. 88
May 9	do.....	2,855,298	4. 88½
May 16	do.....	3,199,100	4. 88½
May 23	do.....	1,261,333	4. 87½
June 13.....	do.....	2,514,217	4. 87½
Do.....	Germany.....	1,000,000	4. 87½
June 18.....	do.....	3,500,709	4. 87½
June 30.....	do.....	2,200	4. 86½
Do.....	France.....	612,918	4. 86½
Do.....	England.....	1,100	4. 86½
July 18	do.....	802	4. 87½
Do.....	Germany.....	1,150	4. 87½
Do.....	France.....	2,028,914	4. 87½
August 8	England.....	3,308,261	4. 88½
Do.....	Germany.....	3,650	4. 88½
Do.....	France.....	2,008,907	4. 88½
August 10	England.....	3,325,417	4. 88
August 13	do.....	541,000	4. 87½
August 14	do.....	8,204,104	4. 87½
September.....	do.....	2,040	4. 87
October.....	do.....	4,246	4. 84
November.....	do.....	11,455	4. 84½
Do.....	Germany.....	2,500	4. 84½
December.....	do.....	2,750	4. 84½
Do.....	England.....	6,370	4. 84½
Total		41,169,063	

RECAPITULATION OF GOLD EXPORTS TO EUROPE.

Description.	England.	France.	Germany.	Grand total of exports to Europe.
United States coins	\$3,652,400	\$2,400,000	\$500,000	
Foreign coins.....		77,000	2,280	
Bars (United States assay office at New York) ..	18,842,411	15,687,482		
Bullion (unknown).....	35,617			
Gold in ore	31,873		19,280	
Total.....	22,562,301	18,164,482	521,560	\$41,248,343

During the same period there was shipped to West Indies, Mexico, and Central and South America the following:

United States coins.....	\$5,551,661
Foreign coins	1,020,899
Bullion	3,000
Total	6,575,560
Grand total of exports	47,823,903

The imports of gold during the same period were as follows:

From Europe:	
United States coins.....	\$1, 265, 822
Foreign coins	1, 694, 716
Bars (United States assay office at New York).....	3, 211, 434
Foreign bullion	894, 972
Total	\$7, 066, 944
From other ports:	
United States coins.....	371, 628
Foreign coins	301, 500
Foreign bullion	3, 761, 853
Total	4, 434, 981
Grand total of imports.....	11, 501, 925

MARKET PRICE OF SILVER DURING THE CALENDAR YEAR 1900.

During the calendar year 1900 India was by far the largest purchaser in the London market of any other country.

The cost of silver purchased during the year by the Indian government in London approximated £5,063,500 sterling, which, at the average price of silver during the year, would purchase about 35,700,000 fine ounces.

According to the official report of the Indian government for the fiscal year ending March 31, 1901, the cost of silver purchased by that country during that year was £6,057,700 sterling, equal to about 47,550,000 fine ounces. After India, China was the largest purchaser of silver, purchasing silver costing about £750,000 sterling in excess of the amount purchased in 1899.

The Paris mint and Straits Settlements were also purchasers. Russia purchased silver to the extent of only £500,000, as against £3,000,000 sterling in 1899. There was little Continental demand for silver during the year 1900.

The highest London price during 1900 was 30½ and the lowest 27. The average price was 28.2863 pence. At the lowest price the value of an ounce fine in United States money was 59.18+, the highest price 66.31+, and the average price 62 cents.

At the lowest price of silver the bullion value of the standard silver dollar was 45 cents, and at the highest 51.28+, and the average 49.67+.

HIGHEST, LOWEST, AND AVERAGE PRICE OF SILVER BULLION AND VALUE OF A FINE OUNCE EACH MONTH DURING THE CALENDAR YEAR 1900.

Month.	High- est.	Low- est.	Average price per ounce British standard, 0.925.	Equivalent value of a fine ounce with exchange at par (\$4.8665).	Average monthly price at New York of ex- change on London.	Equivalent value of a fine ounce based on average monthly price and average rate of exchange.	Average monthly New York price of fine bar silver.
1900.	<i>Pence.</i>	<i>Pence.</i>	<i>Pence.</i>				
January	27½	27	27.3088	\$0.59864	\$4.8725	\$0.59938	\$0.60220
February	27½	27 ⁵ / ₁₆	27.4765	.60015	4.8748	.60346	.60602
March	27½ ¹ / ₁₆	27 ⁷ / ₁₆	27.5810	.60460	4.8591	.60323	.60611
April	27½	27 ⁵ / ₁₆	27.4150	.60096	4.8756	.60208	.60395
May	27½	27½	27.5625	.60577	4.8806	.60619	.60682
June.....	28 ⁹ / ₁₆	27 ⁹ / ₁₆	27.8293	.61005	4.8696	.61043	.61120
July.....	28 ⁹ / ₁₆	27½	28.2375	.61895	4.8712	.61957	.61935
August	28 ⁷ / ₁₆	27½ ⁵ / ₁₆	28.2500	.61927	4.8786	.61839	.61865
September.....	29½	28 ⁷ / ₁₆	28.8375	.63215	4.8689	.63285	.63343
October.....	30½	29½	29.5902	.64865	4.8432	.64551	.64935
November.....	29½ ⁵ / ₁₆	29 ⁷ / ₁₆	29.6634	.65025	4.8470	.64760	.64296
December	29½ ⁵ / ₁₆	29½	29.6900	.65839	4.8488	.64849	.64775
Average			28.2868	.62007	4.8658	.61979	.62065

STOCK OF MONEY IN THE UNITED STATES.

The stock of United States coin in the United States on January 1, 1901, was as follows:

OFFICIAL TABLE OF STOCK OF COIN IN THE UNITED STATES JANUARY 1, 1901.

Items.	Gold.	Silver.	Total.
Estimated stock of coin Jan. 1, 1900	\$873,100,363	\$563,677,658	\$1,436,778,021
Stock of Hawaiian coin in Hawaii	4,000,000	^a 1,000,000	5,000,000
Coinage, calendar year 1900	99,272,943	36,295,321	135,568,264
Total	976,373,306	600,972,979	1,577,346,285
Loss:			
Net exports of United States coin, calendar year 1900.	12,915,320	256,914	13,172,234
United States coin melted for recoinage, calendar year 1900	1,332,258	3,834,537	5,166,795
This amount is shown by subsequent returns not to have been included in the aggregate of subsidiary silver coins taken out of the country in transports and war ships, as stated in the report on the production of gold and silver in the United States for the calendar year 1899.....		190,200	190,200
United States coin taken out in war ships and transports for disbursement in Cuba, Porto Rico, and the Philippine Islands, not recorded at the custom-houses, calendar year 1900.....	2,895,000	^b 1,427,500	4,322,500
United States coin used in the arts, calendar year 1900.	1,500,000	100,000	1,600,000
Total	18,642,578	5,809,151	24,451,729
Estimated stock of coin, Jan. 1, 1901	957,730,728	595,163,828	1,552,894,556

^a Of this amount \$500,000 are \$1 pieces.

^b Of this amount \$710,000 were in standard silver dollars.

NOTE.—The number of standard silver dollars coined to January 1, 1901, is 510,388,615, which, added to the Hawaiian dollar coinage of 500,000, gives a total of 510,888,615.

Since July 1, 1898, the number of standard silver dollars exported has been 2,435,000 and since 1883 the number withdrawn from circulation and melted has been 174,025 (Report of the Director of the Mint, 1900, p. 17), a total disposition of 2,609,025, leaving in the United States on January 1, 1901, a net stock of 508,279,590 standard silver dollars and \$86,884,238 in subsidiary silver coins.

In the above table under the item "United States coin melted for recoinage," the amounts represent nominal or face value.

In the Appendix a table will be found giving in detail the source from which these amounts were obtained.

On January 1, 1901, the cost value of the gold and silver bullion owned by the Government was as follows:

GOLD AND SILVER BULLION IN MINTS AND ASSAY OFFICES JANUARY 1, 1901.

Metal.	Cost value.
Gold.....	\$153,094,872
Silver.....	60,609,638
Total	213,704,510

On January 1, 1901 the Mercantile Safe Deposit Company, in New York City, had on deposit in its vaults 39,347 ounces, fine, of silver bullion, of the commercial value of \$25,290, which, added to the stock of bullion owned by the Government and the stock of coin in the United States, shows a total metallic stock as follows:

METALLIC STOCK JANUARY 1, 1901.

Bullion and coin.	Value.
Gold.....	\$1,110,825,600
Silver (including amount held by Mercantile Safe Deposit Co.).....	655,798,756
Total	1,766,624,356

The metallic stock on hand January 1, 1900, was as follows:

METALLIC STOCK JANUARY 1, 1900.

Bullion and coin.	Value.
Gold.....	\$1,016,178,509
Silver.....	643,239,979
Total	1,659,418,488

The increase during the calendar year in the stock of gold was \$94,647,091, and silver \$12,558,777, a total increase of \$107,205,868.

The stock of metallic and paper money in the United States on January 1, 1901, was located as follows:

LOCATION OF THE MONEYS OF THE UNITED STATES, JANUARY 1, 1901.

Moneys.	In Treasury.	Outside of Treasury.	Total.
Metallic:			
Gold bullion.....	\$153,094,872	.....	\$153,094,872
Silver bullion	60,609,638	\$25,290	60,634,928
Gold coin.....	328,453,044	629,277,684	957,730,728
Silver dollars.....	433,899,702	74,379,888	508,279,590
Subsidiary silver coin	4,491,532	82,392,706	86,884,238
Total	980,548,788	786,075,568	1,766,624,356
Paper:			
Legal-tender notes, old issue	13,336,546	333,344,470	346,681,016
Legal-tender notes, act July 14, 1890	246,764	61,150,236	61,397,000
Gold certificates.....	28,876,270	234,933,109	263,809,379
Silver certificates.....	5,056,152	422,369,848	427,426,000
National-bank notes.....	7,969,904	332,171,271	340,141,175
Currency certificates	40,000	1,520,000	1,560,000
Total	55,525,636	1,385,488,934	1,441,014,570
Grand total.....	1,036,074,424	2,171,564,502	3,207,638,926

GOLD AND SILVER USED IN INDUSTRIAL ARTS IN THE UNITED STATES DURING THE CALENDAR YEAR 1900.

The problem of industrial consumption of the precious metals has been the subject of special inquiry conducted by this Bureau for several years past and is reserved for fuller treatment in my forthcoming report for the fiscal year ended June 30, 1901. A summary of the principal statements showing the quantity and value of precious metals used in industrial arts in the United States during the calendar year 1900 is submitted below.

Among the purveyors of gold and silver bars for use in the industrial arts the United States mint at Philadelphia and the United States assay office at New York hold the foremost places, which

brings the larger portion of the total material consumed in the arts under Government notice as a matter of public record.

The quantity and value of the gold and silver bars manufactured by the United States mint at Philadelphia during the calendar year 1900 were as follows:

VALUE AND COMPOSITION OF BARS MANUFACTURED FOR USE IN THE INDUSTRIAL ARTS BY THE UNITED STATES MINT AT PHILADELPHIA DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1900.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion	126,465.540	\$2,614,274.73	4,636.12	\$5,994.17
Jewelry, etc	5,037.066	104,125.41	64,064.24	82,830.53
United States coin	510.259	10,547.97	20.52	26.53
Foreign bullion			10,870.86	14,055.26
Foreign coin			86.66	112.05
Total	132,012.865	2,728,948.11	79,678.40	103,018.54

The quantity and value of the gold and silver bars manufactured by the United States assay office at New York during the calendar year 1900 were as follows:

VALUE AND COMPOSITION OF BARS MANUFACTURED FOR USE IN THE INDUSTRIAL ARTS BY THE UNITED STATES ASSAY OFFICE AT NEW YORK DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1900.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion	527,713.543	\$10,908,807.08	3,302,325.64	\$4,269,673.56
United States coin			153.17	198.03
Foreign material	28,287.423	584,752.94	706,202.76	913,070.23
Old jewelry, etc	101,922.714	2,106,929.49	480,143.58	620,791.69
Total	657,923.680	13,600,489.51	4,488,825.15	5,803,733.51

All United States coin used in the manufacture of bars is either abraded or mutilated. The relative importance of old jewelry as material for industrial arts appears from the following table:

UNITED STATES BARS.

Material used.	Gold.			Silver.		
	Philadel- phia mint.	New York assay office.	Total.	Philadel- phia mint.	New York assay office.	Total.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Domestic bullion	95.8	80.2	82.8	5.8	73.6	72.4
Old jewelry, etc	3.8	15.5	13.5	80.6	10.7	11.9
Foreign material		4.3	3.6	13.6	15.7	15.7
All other	.4		.1			
Total	100	100	100	100	100	100

Upon an examination of these figures it appears that, on the whole, old jewelry entered to the amount of about one-eighth into the manufacture of gold and silver bars. Most of it was operated upon at the New York assay office. The manufacture of silver bars at the Philadelphia mint was very limited; nearly all the silver bullion found its

way to the New York assay office. This explains the high percentage of old silver jewelry operated upon at the Philadelphia mint. The actual quantity, however, was too small to materially affect the percentage in the last column.

The quantity and value of the gold and silver bars sold to manufacturers and jewelers by the private refineries in the United States during the calendar year 1900 were ascertained, as in former years, by correspondence with the refineries. An encouraging growth of public interest to the subject of the present inquiry may be noted from the increasing number of replies received at this Bureau to the circulars addressed, as appears from the following table:

	1900.	1899.
Firms addressed	102	81
Firms replying	97	60
Firms manufacturing	60	37
Firms not manufacturing	37	23

Eliminating those refineries which were manufacturing no bars, out of 65 firms addressed in 1900, 60 replied, whereas, in 1899, out of 58 firms addressed, only 37 replied. The results are given in the following table:

BARS FOR INDUSTRIAL USE FURNISHED GOLDSMITHS AND OTHERS BY PRIVATE REFINERIES DURING THE CALENDAR YEAR 1900.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion, exclusive of United States bars ...	51,255	\$1,059,545	7,116,523	\$9,201,161
United States bars	175,797	3,634,047	903,771	1,168,512
United States coin	27,586	570,257	6,540	8,456
Foreign material	7	150	223,290	288,698
Old plate, jewelry, and other old material	61,415	1,269,557	1,231,798	1,592,628
Total	316,060	6,533,556	9,481,922	12,259,455

Of the bars furnished by private refineries to manufacturers and jewelers for industrial use, \$3,634,047 in gold and \$1,168,512 in silver were "United States bars"—that is, bars bearing the stamp of Government institutions, and, in order to avoid duplication, these amounts are deducted from the totals reported by private refineries.

The following table exhibits the quantity and value of gold and silver bars sold manufacturers and jewelers by the private refineries in the United States, after eliminating the "United States bars," during the calendar year 1900:

BARS FOR INDUSTRIAL USE FURNISHED GOLDSMITHS AND OTHERS BY PRIVATE REFINERIES DURING THE CALENDAR YEAR 1900.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion	51,255	\$1,059,545	7,116,523	\$9,201,161
United States coin	27,586	570,257	6,540	8,456
Foreign material	7	150	223,290	288,698
Old material	61,415	1,269,557	1,231,798	1,592,628
Total	140,263	2,899,509	8,578,151	11,090,943

It will be seen from this table that United States silver coin is used very little in the manufacture of silver bars by private refineries; on the contrary, the quantity of United States gold coin is quite considerable. The reason of the difference is obviously in the depreciation of silver. Old material was used to a greater extent by the private refineries than by the Philadelphia mint and New York assay office, as appears from the following table of percentages:

Material used.	Gold.	Silver.
Domestic bullion.....	36.4	83
United States coin.....	19.7	.1
Foreign material.....		2.6
Old material.....	43.9	14.3
Total.....	100	100

From this table it appears that private refineries use chiefly old gold and United States gold coin in the manufacture of gold bars, all new gold used being only somewhat above one-third of the entire quantity handled by them for this purpose. The percentage of old silver, on the contrary, does not differ materially from that found for the mint and assay office above named.

To obtain the aggregate consumption of gold and silver bars, the figures for Government institutions are added to those of private refineries and the results are presented in the table next following. The figures thus obtained must needs vary from the actual quantity of bars consumed during the year in the United States, inasmuch as the amount of bars manufactured during the year in the Government institutions is not identical with that sold by them to the trade within the same year. Yet, in the long run, the discrepancies must be confined within very narrow limits.

GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND ARTS DURING THE CALENDAR YEAR 1900.

Material used.	Gold.	Silver (coin- ing value).	Total.
Domestic bullion.....	\$14,582,627	\$13,476,829	\$28,059,456
United States coin.....	580,805	8,681	589,486
Foreign material.....	584,903	1,215,935	1,800,838
Old material.....	3,480,612	2,296,250	5,776,862
Total.....	19,228,947	16,997,695	36,226,642

PERCENTAGE RATES OF GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND ARTS DURING THE CALENDAR YEAR 1900.

Material used.	Gold.	Silver.
Domestic bullion.....	75.8	79.4
United States coin.....	3.0	
Foreign material.....	3.1	7.1
Old material.....	18.1	13.5
Total.....	100	100

From these figures it appears that three-quarters, in round numbers, of all gold bars manufactured for use in the arts in this country is new gold of domestic production, and over one-sixth, old jewelry, etc.; United States coin is melted only to a very small degree.

In the manufacture of silver bars the use of United States coin is practically infinitesimal (less than 1 per 1,000); new domestic silver amounts to about four-fifths, and old silver (jewelry, plate, etc.) to over one-eighth.

To obtain the total quantity of gold and silver used in the industrial arts a further allowance must be made for United States coin melted by goldsmiths and jewelers. The results of special inquiries made upon the subject by this Bureau will be fully summarized and discussed in my annual report.

Estimating for the present, as in former years, the total amount of gold coin used in the arts at \$1,500,000 and silver coin at \$100,000, the industrial consumption of the precious metals in the United States during the calendar year 1900 would be as follows:

INDUSTRIAL CONSUMPTION OF THE PRECIOUS METALS DURING THE CALENDAR YEAR 1900.

Material used.	Gold.	Silver (coin- ing value).	Total.
Domestic bullion	\$14,582,627	\$13,476,829	\$28,059,456
United States coin	1,500,000	100,000	1,600,000
Foreign material	584,903	1,215,935	1,800,838
Old material	3,480,612	2,296,250	5,776,862
Total	20,148,142	17,089,014	37,237,156

The following table exhibits the aggregate value of all gold bars furnished by the United States mint at Philadelphia and assay office at New York to the trade, in exchange for gold coin, under the provisions of the act of May 26, 1882:

GOLD BARS EXCHANGED FOR GOLD COIN AT THE MINT AT PHILADELPHIA AND ASSAY OFFICE AT NEW YORK DURING THE CALENDAR YEAR 1900.

Months.	Philadelphia.	New York.	Total.
1900.			
January	\$246,934.08	\$795,572.08	\$1,042,506.16
February	145,624.22	774,484.37	920,108.59
March	191,284.55	933,199.24	1,124,483.79
April	191,727.12	574,872.56	766,599.68
May	177,091.41	9,110,186.52	9,287,277.93
June	166,789.22	7,816,700.02	7,983,489.24
July	181,758.38	2,665,851.23	2,847,609.61
August	241,025.02	17,672,970.83	17,913,995.85
September	248,703.06	811,869.58	1,060,572.64
October	299,917.00	1,094,530.19	1,394,447.19
November	320,155.68	888,322.64	1,208,478.32
December	203,265.06	629,733.25	832,998.31
Total	2,614,274.80	43,768,292.51	46,382,567.31

These figures include both small bars manufactured for use in the arts and large bars manufactured for export. The total amount was distributed as follows:

Exported	\$34,529,893.63
Employed for industrial purposes	11,852,673.68
Total	46,382,567.31

The amount stated to be employed for industrial purposes falls considerably short of the above statements of the quantity of gold bars manufactured for use in the arts during the calendar year 1900. The difference represents the addition to the stock of such bars in the vaults of the Philadelphia mint and New York assay office.

The following table shows the amounts and the classification of gold and silver used in the industrial arts in the United States each year since 1880:

GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND THE ARTS, AND CLASSIFICATION OF THE MATERIAL USED, BY CALENDAR YEARS, SINCE 1880.

GOLD.

Calendar year.	United States coin.	New material.	Old material.	Foreign bullion and coin.	Total.
1880.....	\$3,300,000	\$6,000,000	\$395,000	\$1,267,600	\$10,962,600
1881.....	2,700,000	7,000,000	522,900	1,547,800	11,770,700
1882.....	2,500,000	7,000,000	696,500	671,500	10,868,000
1883.....	4,875,000	7,840,000	1,549,300	194,500	14,458,800
1884.....	5,000,000	6,000,000	3,114,500	385,500	14,500,000
1885.....	3,500,000	6,736,927	1,408,902	178,913	11,824,742
1886.....	3,500,000	7,003,480	1,928,046	638,003	13,069,529
1887.....	3,500,000	9,090,342	1,835,882	384,122	14,810,346
1888.....	3,500,000	9,893,057	2,402,976	718,809	16,514,842
1889.....	3,500,000	9,686,827	3,218,971	291,258	16,697,056
1890.....	3,500,000	10,717,472	3,076,426	362,062	17,655,960
1891.....	3,500,000	10,697,679	4,860,712	628,525	19,686,916
1892.....	3,500,000	10,588,703	4,468,685	771,686	19,329,074
1893.....	1,500,000	8,354,482	2,777,165	804,254	13,435,901
1894.....	1,500,000	6,430,073	2,184,946	543,585	10,658,604
1895.....	1,500,000	8,481,789	2,976,269	471,027	13,429,085
1896.....	1,500,000	7,209,787	2,369,343	316,804	11,395,934
1897.....	1,500,000	7,184,822	2,571,428	613,981	11,870,231
1898.....	1,500,000	9,463,262	2,164,976	437,641	13,565,879
1899.....	1,500,000	13,267,287	2,734,985	344,906	17,847,178
1900.....	1,500,000	14,582,627	3,480,612	584,903	20,148,142
Total.....	58,375,000	183,228,616	50,738,524	12,157,379	304,499,519

GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND THE ARTS, AND CLASSIFICATION OF THE MATERIAL USED, ETC.—Continued.

SILVER (COINING VALUE).

Calendar year.	United States coin.	New material.	Old material.	Foreign bullion and coin.	Total.
1880.....	\$600,000	\$5,000,000	\$145,000	\$353,000	\$6,098,000
1881.....	200,000	5,900,000	178,000	371,000	6,649,000
1882.....	200,000	6,344,300	212,900	440,300	7,197,500
1883.....	200,000	4,623,700	561,900	155,000	5,540,600
1884.....	200,000	4,500,000	170,000	650,000	5,520,000
1885.....	200,000	4,539,875	462,186	62,708	5,264,769
1886.....	200,000	3,626,195	404,155	825,615	5,055,965
1887.....	200,000	4,102,734	480,606	654,991	5,438,331
1888.....	200,000	6,477,857	652,047	771,985	8,101,889
1889.....	200,000	7,297,933	611,015	657,997	8,766,945
1890.....	200,000	7,143,635	640,100	1,245,419	9,229,154
1891.....	200,000	7,289,073	858,126	1,256,101	9,603,300
1892.....	200,000	7,204,210	647,377	1,249,801	9,301,388
1893.....	100,000	6,570,737	1,222,836	1,740,704	9,634,277
1894.....	100,000	8,579,472	1,221,177	982,399	10,883,048
1895.....	100,000	9,825,387	1,378,136	973,501	12,277,024
1896.....	100,000	7,965,449	1,076,829	1,061,995	10,204,273
1897.....	100,000	9,200,497	1,103,460	797,193	11,201,150
1898.....	100,000	10,176,784	949,312	632,449	11,858,545
1899.....	100,000	12,845,942	2,047,584	684,137	15,677,663
1900.....	100,000	13,476,829	2,296,250	1,215,935	17,089,014
Total.....	3,800,000	152,690,609	17,318,996	16,782,230	190,591,835

THE WORLD'S INDUSTRIAL CONSUMPTION.

Since 1893 this Bureau has endeavored to obtain, through the United States representatives abroad, official estimates from the various countries of the world of the consumption of precious metals in the arts and industries.

The results of these inquiries, though at times incomplete, are considered sufficiently full and accurate to encourage renewed efforts.

The interrogatories sent out by this Bureau for 1900 were as follows:

What was the weight of fine gold used in the industrial arts during the calendar year 1900?

What amount of this was new gold, what amount old gold, and what amount coins?

What was the weight of fine silver used in the industrial arts during the calendar year 1900?

What amount of this was new silver, what amount old silver, and what amount coins?

The following verbatim replies of all countries as to their consumption of precious metals in the arts during 1900 is submitted, together with such other matter relative to the question as was assumed to be of value:

From Argentina.—"Not ascertainable, as there are no statistics on the subject."

From Australasia.—South Australia: "Can not obtain any information on these points." Queensland: "No information available." Victoria: "Impossible to ascertain." New Zealand: "No answer." Tasmania: "There are no means of ascertaining. The quantities of gold and silver used will probably be insignificant."

From Austria-Hungary.—Austria: "The jewelry, fancy articles, wire, etc., brought to the imperial stamping office in Vienna during the calendar year 1900 to be stamped, show the domestic consumption of gold to have been as follows:

Items.	Gross weight.	At the average standard of 1899, per kilogram.	Fine gold.
	<i>Kilograms.</i>		<i>Kilograms.</i>
Domestic articles of gold	4,704.125	.58298	2,742.410
Domestic double (plated) wares—that is, the amount of gold placed upon them at a rate of 2.5 per cent.	116.000	-----	2.900
Wire—that is, the amount of gold placed upon it at a rate of 1.7 per cent	1,722.796	-----	29.287
Total	-----	-----	2,774.597

"No data are given as yet showing the amount of gold consumed during the year 1900 for other industrial uses, especially in the gilding by fire and galvanism.

"Of the articles of gold brought to the imperial stamping office in Vienna to be stamped, as shown in the reply to interrogatory No. 4, it is assumed that 27 per cent were manufactured of old articles of gold, and this assumption would show that there were used in the year 1900, 2,025.456 kilograms fine new gold and 749.141 kilograms fine old gold. The articles brought to the imperial stamping office during the year 1900 to be stamped, show the domestic consumption of silver to have been as follows:

Items.	Gross weight.	At the average standard of 1899, per kilogram.	Fine silver.
	<i>Kilograms.</i>		<i>Kilograms.</i>
Domestic articles of silver	54,061.855	.7943	42,941.331
Domestic wires	-----	-----	2,324.143
Total	-----	-----	45,265.474

“No data are given as yet showing the amount of silver consumed during the year 1900 for other industrial uses.

“Of the articles brought to the imperial stamping office at Vienna to be stamped during the year 1900 it is assumed that 20 per cent were manufactured of old articles of silver, and this assumption would show that there were used 36,212.379 kilograms fine new silver and 9,053.095 kilograms fine old silver.”

Hungary: “No detailed data are on hand showing the amount of gold and silver used for industrial purposes. There were presented at the Royal Hungarian principal stamping office for the purpose of being officially stamped—

A.—Domestic goods.

	Kilograms.
(1) Gold ware.....	1,240.873
(2) Silverware.....	7,897.849
(3) Gilt wire, containing { Gold.....	4.428
{ Silver.....	343.611
(4) Silver wire.....	363.611

B.—Foreign goods.

(5) Various gold ware.....	74.537
(6) Gold watches.....	246.697
(7) Gilt wire, containing { Gold.....	.089
{ Silver.....	6.821
(8) Various silverware.....	1,682.274
(9) Silver watches.....	.275

“1.2002 kilograms pure gold and 9.175 kilograms pure silver were used for the coinage of medals. The material used was new.”

The amount used for “other industrial purposes” is not given, but in 1897 and since, an amount equal to 17 per cent in gold and 24 per cent in silver of the articles stamped was added for “other industrial purposes.” Following this custom the consumption was as follows:

Items.	Kilograms, fine.	
	Gold.	Silver.
Austria.....	2,774.597	45,265.474
Hungary.....	1,567.824	10,303.616
Total.....	4,342.421	55,569.090
In addition, for “other industrial purposes” (gold, 17 per cent; and silver, 24 per cent).....	738.212	13,336.582
Total consumption.....	5,080.633	68,905.672
Less “old material” (gold, 27 per cent; silver, 20 per cent).....	1,371.771	13,781.134
Net consumption “new material”.....	3,708.862	55,124.538
Coining value (United States money).....	\$2,464,910	\$2,290,976

AUSTRIA-HUNGARY.

[Translated and condensed from Ergebnisse der Punzierung im Jahre 1899, reprint from the report of the imperial and royal ministry of finance.]

The law requires all gold and silver to be stamped at a Government stamping office; an exemption is made for imported precious metals and manufactures which bear the stamp of a foreign government assay office. The Government is thus enabled to easily ascertain the industrial consumption of gold and silver. The figures relating to the same are found in the following tables:

AUSTRIA.

ARTICLES STAMPED IN GOVERNMENT OFFICES, 1899.

Description.	Kilograms, fine.	
	Gold.	Silver.
I. Domestic:		
Manufactured articles.....	2,606.819	43,217.367
Gilt wire.....	32.383	1,696.557
White wire.....		602.273
Total.....	2,639.202	45,516.197
II. Foreign:		
Manufactured articles.....	1,468.672	13,046.428
Gilt wire.....	.650	37.188
White wire.....		81.007
Total.....	1,469.322	13,164.623
Grand total.....	4,108.524	58,680.820

In addition to that, 25.420 kilograms of fine gold were consumed in the manufacture of gold-plated silver ware, of which 24.893 kilograms were contained in imported goods and 75.165 kilograms of fine silver were consumed in the manufacture of silver-plated wire; no figures are given showing the distribution of this item between domestic and imported goods.

As the item does not exceed, however, 0.13 per cent, it may be disregarded as a negligible quantity.

The total industrial consumption for the thirty-two years from 1868 to 1899 (both inclusive) was as follows:

	Kilograms, fine.	
	Gold.	Silver.
Domestic.....	55,347.377	984,309.714
Imported.....	29,426.170	243,129.672
Total.....	84,773.547	1,227,439.386

The domestic industrial consumption of gold and silver for the last three years is given in the table below:

Year.	Gold.				
	Kilograms, fine.			Per cent.	
	Manu- factured arti- cles.	All others.	Total.	Manu- factured articles.	All others.
1897.....	2,352.339	543.110	2,895.449	81.2	18.8
1898.....	2,537.662	520.883	2,058.545	82.9	17.1
1899.....	2,639.202	496.108	3,135.310	84.2	15.8

Year.	Silver.				
	Kilograms, fine.			Per cent.	
	Manu- factured arti- cles.	All others.	Total.	Manu- factured articles.	All others.
1897.....	44,252.138	13,052.663	57,304.801	77.2	22.8
1898.....	46,975.388	12,561.894	59,537.282	78.9	21.1
1899.....	45,516.197	12,655.929	58,172.126	78.2	21.8

The second column ("All others") includes all gold and silver consumed in galvanizing, gold and silver plating, manufacturing gold and silver leaves, photography, dentistry, etc.

A classification of all gold employed in the industrial arts shows the following results:

Classification.	Kilograms, fine.		Per cent.	
	1898.	1899.	1898.	1899.
1. Coin.....	2,126.892	2,250.565	69.54	71.73
2. Alloyed gold.....	443.155	468.034	14.49	14.93
3. Native gold.....	132.272	166.278	4.32	5.30
4. Fine gold.....	356.226	250.433	11.65	7.99
Total.....	3,058.545	3,135.310	100	100

A specification of the gold coins melted for use in the industrial arts is found in the following table:

Description.	Number of pieces.	
	1898.	1899.
Ducats.....	140,750	145,161
Franz-Joseph d'or.....	3,417	4,297
20-franc pieces.....	176,025	172,305
20-mark pieces.....	40,957	69,055
Other coin.....	41,961	31,547
Total.....	403,110	422,361

The ratio of old jewelry, plate, etc., remelted for use in the industrial arts is estimated as follows:

	Per cent.
1894.....	36
1895.....	36
1896.....	27
1897.....	27

The last rate (27 per cent) is accepted for the year 1899, which gives 2,288.776 kilograms, fine, of the new product used for the first time in the industrial arts, and 846.534 kilograms, fine, of old material remelted for use in the arts.

A classification of all silver employed in the arts gives the following results:

Classification.	Kilograms, fine.		Per cent.	
	1898.	1899.	1898.	1899.
1. Coins.....	513.345	662.570	.86	1.10
2. Alloyed silver.....	4,848.562	5,715.364	8.14	9.80
3. Native silver.....	1,295.431	1,489.461	2.18	2.60
4. Fine silver.....	52,879.944	50,304.731	88.82	86.50
Total.....	59,537.282	58,172.126	100	100

It is estimated that 20 per cent of all this silver is old silver, plate, etc., remelted for use in the industrial arts, which gives for the year 1899 11,634.425 kilograms, fine, of old silver, and 46,537.701 kilograms, fine, of new silver.

The imports of gold and silver articles bearing foreign assay office stamp is shown in the following table:

Metals.	Kilograms, fine.	
	1898.	1899.
Gold	1,446.394	1,494.215
Silver	13,064.541	13,164.623

This includes the fine gold contents of gold-plated silverware.

The total industrial consumption of the precious metals is summarized in the following table:

RECAPITULATION.

Classification.	Gold.		Silver.	
	1898.	1899.	1898.	1899.
Articles of domestic production	<i>Kilograms</i> 2,232.738	<i>Kilograms.</i> 2,288.776	<i>Kilograms.</i> 47,629.826	<i>Kilograms.</i> 46,537.701
Imported	1,446.394	1,494.215	13,064.541	13,164.623
Total	3,679.132	3,782.991	60,694.367	59,702.324

HUNGARY.

According to reports from the Royal Hungarian stamping office the following quantities of gold and silver were assayed in Hungary:

Classification.	Kilograms, fine.			
	Gold.		Silver.	
	1898.	1899.	1898.	1899.
Domestic:				
Manufactured articles	814.179	784.585	9,852.553	7,831.111
Gilt wire	7.236	9.163	509.172	544.719
White wire			262.742	405.658
Total	821.415	793.748	10,624.467	8,781.488
Imported:				
Manufactured articles	207.000	167.000	2,493.586	2,203.387
Gilt wire	.019	.097	1.398	6.835
Total	207.019	167.097	2,494.984	2,210.222

No white silver wire was imported in 1898 and 1899.

The total industrial consumption for the thirty-two years from 1868 to 1899 (both inclusive) was as follows:

Classification.	Kilograms, fine.	
	Gold.	Silver.
Domestic	13,654.017	95,968.993
Foreign	2,721.313	23,385.335
Total	16,375.330	119,354.328

Bosnia.—The consumption of the precious metals in the industrial arts in 1899 was as follows:

Classification.	Kilograms, fine.	
	Gold.	Silver.
Domestic.....	0.067	273.473
Imported.....	.977	11.647
Total	1.044	285.120

From Brazil.—“No data, but the amount was small.”

From British India.—“Estimate of the quantity of gold annually employed in industry: There are no data from which to make an estimate, except that it may be said that all the uncoined gold imported is manufactured into plate and ornaments. All the gold produced in India is exported to London.

“Estimate of the quantity of silver annually employed in industry: Until the closure of the Indian mints in June, 1893, practically all the silver imported into India (none is produced in the country) was coined either in the mints of the government or in those of the native states. Much of the coin was withdrawn annually from circulation to be hoarded or converted into ornaments, but there are no data, except the imports of silver during the period since the closure of the government mints, on which to frame an estimate of the quantity actually so withdrawn. The import trade in silver was materially influenced for a period by speculation arising out of the special and transitory conditions which followed the closure of the mints, and the two famines of 1896–97 and 1899–1900 have also specially affected the imports, which, therefore, still form an uncertain basis on which to frame an estimate. It is also not possible to say what proportion of the imported silver is hoarded in the form of rupees, bars, or ingots, and what proportion is manufactured into ornaments and plate.”

From Central America.—Costa Rica: “No means of knowing.” Guatemala: “Impossible to ascertain.” Nicaragua: “As near as can be estimated, about 75 ounces of gold was used in the industrial arts (50 ounces coin, 20 ounces old, and 5 ounces new).

“About 1,600 ounces of silver were used in the industrial arts during calendar year 1900 (1,000 ounces coin, 600 ounces old silver).

“These estimates are made as accurate as possible from information obtained from the manufacturers. No statistics of the kind are found, and the manufacturers buy their coin from travelers and old silver and gold from private parties.”

From Denmark.—“Minister of finance unable to give any information.”

From Ecuador.—“None.”

From Egypt.—“No means of knowing.”

From Finland.—“The official reports contain statements of the weight of gold and silver articles of manufacture assayed within the grand duchy since 1827:

WEIGHT OF GOLD AND SILVER ARTICLES OF MANUFACTURE ASSAYED IN FINLAND.

Year.	Gold.	Silver.
	<i>Grams.</i>	<i>Grams.</i>
1827-1896	2,852,979	39,055,530
1897	170,471	1,203,630
1898	197,497	1,278,120
1899	193,554	1,380,870
Total	3,414,501	42,918,150

From France.—"Gold, 26,000 kilograms, fine; silver, 246,000 kilograms, fine. No information as to new or old material." (Dr. Soetbeer, in his estimates for the industrial consumption in France, calculated that 20 per cent of it was old material.)

From Germany.—"Inquiries have so far been made on the subject only for the years 1896 and 1897, and the results were embodied in the answers to the interrogatories for the calendar year 1898.

"Regarding silver used in the industrial arts during calendar year 1900, in the absence of official information these questions can not be answered."

From Great Britain.—"No information available."

The Bureau of the Mint has received no official information as to the industrial gold consumption of England in 1900, and recourse is therefore had, as last year, to an estimate of the same. According to the memorandum by Mr. W. Chandler Roberts-Austen, chemist and assayer, published in the reports of the deputy master of the royal mint, London, the number of ounces of gold wares assayed and marked by the wardens of the assay offices at Birmingham and Chester annually from 1889 was as follows:

Year.	Birming- ham.	Chester.	Total.
	<i>Troy ozs.</i>	<i>Troy ozs.</i>	<i>Troy ozs.</i>
1889	158,769	41,883	200,652
1890	193,426	51,166	244,592
1891	230,136	53,715	283,851
1892	228,018	55,789	283,807
1893	229,016	61,318	290,334
1894	223,759	62,442	286,201
1895	239,472	73,283	312,755
1896	283,423	97,281	380,704
1897	311,335	109,187	420,522
1898	333,741	130,480	464,221
1899	362,481	148,895	511,376
1900	371,433	161,958	536,391

These figures are far from representing the total industrial gold consumption of the United Kingdom, which must, if we are to be guided by earlier estimates, be placed at, at least, twice these amounts.

Professor Lexis estimated it to have been, in 1895, 500,000 ounces, or about 15,500 kilograms, net.

The wares stamped have increased $71\frac{1}{2}$ per cent since that date, equal to an increase of $11,082\frac{1}{2}$ kilograms, which, after deducting 25 per cent for old material, would give a net increase of 8,312 kilograms; hence this Bureau estimates the gold consumption for 1900 at 23,812 kilograms.

No official estimate for silver has been received, and hence the report of Mr. Roberts-Austen of the amounts stamped at the assay office is given:

Year.	Birmingham.	Sheffield.	Chester.	Total.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
1894	1,401,449	496,148	227,250	2,124,847
1895	1,796,056	715,248	311,624	2,822,928
1896	2,117,622	922,482	473,887	3,513,991
1897	2,303,157	974,477	556,801	3,834,435
1898	2,530,019	1,165,017	592,783	4,287,819
1899	2,823,525	1,323,917	741,044	4,888,486
1900	2,957,679	1,252,688	889,953	5,100,320

Professor Lexis estimated the net silver consumption of England in 1895 at 140,000 kilograms. The wares stamped have increased 81 per cent since that date, equal to an increase of 113,400 kilograms, or 85,050 kilograms net (deduction of 25 per cent being made for old material). Hence this Bureau estimates the silver consumption for 1900 at 225,050 kilograms.

From Greece.—"Not known."

From Haiti.—"No statistics."

From Japan.—"Unknown."

From Korea.—"No statistics available."

From Liberia.—"Gold, none; silver, unknown."

From the Netherlands.—"The quantity of gold used in industrial works in the year 1900 may be fixed at 628 kilograms of fine gold. What amount of this was new or old gold is unknown."

"The quantity of silver used in industrial works in the year 1900 may be fixed at 10,951 kilograms of fine silver. What amount of this was new or old silver is unknown."

From Norway.—"It is not possible to give any information as to the weight and value of gold and silver used during the year in the industrial arts."

From Peru.—"Not ascertainable."

From Portugal.—"The gold employed in industrial arts (by goldsmiths) amounted, approximately, to 2,036 kilograms."

"The silver employed in the industrial arts (by silversmiths) amounted, approximately, to 8,585 kilograms."

From Russia.—"The Imperial mint supplied 16 pounds of fine gold to the Imperial potteries and to Messrs. Korniloff's china works."

From San Salvador.—Gold, "estimated 1,000 ounces, fine;" silver, "estimated 450 pounds. No statistics are available as to what amount of this was new or old material."

From Siam.—No answer.

From South Africa.—Cape Colony: "It is regretted that the colonial treasury is not in a position to furnish particulars under these headings." Natal: "No available information." Transvaal: "No gold was used in industrial arts."

From Spain.—"This datum does not exist. Not known."

From Sweden.—"The quantity of gold and silver annually used in Sweden in the industrial arts can not possibly be stated exactly, but according to information given by the Royal assay office the weight of the objects stamped there annually amounts to about 600 kilograms of fine gold and 5,500 kilograms of fine silver. It is impossible to say how large a proportion of these amounts was obtained by melting coin

or old gold and silver objects. For striking medals, 10 kilograms gold and 250 kilograms silver were used during the same year. For this purpose new gold and silver were exclusively used."

From Switzerland.—"The total weight of fine gold used in the industrial arts in Switzerland during the year 1900 amounts to about 10,730 kilograms (37,000,000 francs)." (These figures are only approximate, as there does not exist in Switzerland any official control over jewelry.) "Of this quantity, about 6,420 kilograms (22,150,000 francs) were new gold and about 4,310 kilograms (14,870,000 francs) were old gold. The coins melted down are included among the new gold. The exact proportions of these, however, can not be specified. The total weight of fine silver used in the industry in 1900 amounts to about 77,000 kilograms (8,000,000 francs), calculation based upon current values. Of this quantity were new silver about 56,500 kilograms (5,876,000 francs), and old silver about 20,500 kilograms (2,132,000 francs). What concerns the melting of silver coins for use in the industrial arts, we believe that no such operation will be effected at this time, as, according to the actual value of silver bullion, the melting of silver coins would impose on the manufacturer a loss of 53 per cent (the intrinsic value of a 5-franc piece being only 2.34 francs actually)."

From Turkey.—"There are no statistics."

For other countries.—For other countries the consumption of gold is estimated at 5,000 kilograms—following previous estimates of this Bureau—and of silver at 50,000 kilograms, being Dr. Soetbeer's estimate in 1835 with 25 per cent added.

The following table of the world's industrial consumption was compiled from the above returns, the figures for 1899 being used where no official information was received for 1900:

THE WORLD'S INDUSTRIAL CONSUMPTION OF GOLD AND SILVER IN 1900.

Country.	Gold.		Silver.		
	Weight.	Value.	Weight.	Coining value.	Commercial value.
	<i>Kilograms.</i>		<i>Kilograms.</i>		
Austria-Hungary	3,709	\$2,464,900	55,125	\$2,291,000	\$1,098,600
Belgium	2,543	1,690,100	20,000	831,200	398,600
Brazil	750	498,400			
Central America	2	1,200	31	1,300	600
Egypt	1,077	715,800	5,034	209,200	100,300
Finland	194	128,900	1,381	57,400	27,500
France	20,800	13,823,700	196,800	8,179,000	3,922,100
Germany	10,743	7,139,800	150,000	6,234,000	2,989,400
Great Britain	23,812	15,825,500	225,050	9,353,100	4,485,100
Italy	5,000	3,323,000	21,000	872,800	418,500
Netherlands	628	417,400	10,951	455,100	218,200
Paraguay	3	2,000	100	4,200	2,000
Portugal	2,036	1,353,100	8,585	356,800	171,100
Russia	4,259	2,830,500	114,733	4,768,300	2,286,600
San Salvador	31	20,700	168	7,000	3,400
Sweden	610	405,400	5,750	239,000	114,600
Switzerland	6,420	4,266,700	56,500	2,348,100	1,126,000
United States	25,079	16,667,500	355,938	14,792,800	7,093,600
Other countries	5,000	3,323,000	50,000	2,078,000	996,500
Total	112,696	74,897,600	1,277,146	53,078,300	25,452,700

WORLD'S PRODUCTION OF GOLD AND SILVER IN 1900.

The world's gold production in 1900 was 384,641 kilograms, or 12,366,319 ounces, fine, of the value of \$255,634,500.

The result is largely an estimate, since most of the foreign countries collect no statistics of the production of gold and silver, and the data must be obtained from their exports and coinage. In many cases the official figures are a year or two late, and the product for 1900 must be assumed to be equal to that of the last year for which official information is available, and, further, the amount of local consumption in the industrial arts is largely a matter of conjecture.

These matters are more fully treated in Part II, under the heads of the several countries.

It was estimated last year that the possible error from all sources in the figures for 1899 might amount to a deficiency of not more than 3 per cent of the world's gold product.

Upon a comparison of the preliminary estimate for 1899 made in the preceding report with the corrected figures for the same year received since, the difference appears to be about 0.2 per cent only, with four countries still to hear from; the aggregate product of those countries does not exceed, however, 0.05 per cent of the world's production, and could not affect the result. This does not include possible inaccuracies in the final results, but materially reduces the estimated error.

The hostilities in the Transvaal reduced the world's production of 1900 by \$64,000,000, but the decrease was partly made up by the increases in other countries, reducing the net decrease to \$51,534,300, or about one-sixth of the world's output for 1899. Notwithstanding this extraordinary loss, the gold production of 1900 was considerably in excess of that of 1897. Eliminating Africa, the gold production of 1900 shows an increase over the previous year amounting, in round numbers, to \$12,800,000, which is equal to 5.5 per cent. There is no reason to apprehend a decline in gold mining for some years to come. Operations have been resumed in the Transvaal. Australia, particularly West Australia, is not yet half developed; Alaska and the Yukon have only fairly begun to produce, while the recent steady increase in Colorado and other Western States shows no sign of abating. The present output differs from that in the fifties, when the California placers yielded such enormous stores of gold, because those could be exhausted, more or less speedily, while the present yield comes from the working of low-grade ore, rendered profitable by improved modern methods of reduction, and is practically unlimited.

The following table shows, in round numbers, the increase and decrease for 1900 as compared with 1899:

GOLD.

Country.	Increase in 1900.	Decrease in 1900.
United States.....	\$8, 117, 600	-----
Mexico.....	500, 000	-----
Canada.....	6, 556, 200	-----
Africa.....	-----	\$64, 351, 100
Australasia.....	-----	5, 822, 700
Russia.....	-----	2, 021, 600
Austria-Hungary.....	198, 000	-----
Germany.....	-----	8, 200
Sweden.....	-----	11, 800
Italy.....	-----	39, 900
Spain.....	6, 600	-----
Great Britain.....	217, 400	-----
Argentina.....	-----	94, 000

GOLD—Continued.

Country.	Increase in 1900.	Decrease in 1900.
Chile	\$329,000	
Colombia		\$649,700
Ecuador	59,800	
Brazil	1,180,800	
Guiana:		
British		4,600
Dutch		11,200
French		108,000
Peru	224,500	
Uruguay	3,300	
Central America		86,100
Korea	3,041,000	
British India	776,700	
East Indies:		
British	146,300	
Dutch	317,400	
Total	21,674,600	73,208,900
Net decrease		51,534,300

The world's production of silver in 1900 was 5,377,008 kilograms, or 172,838,870 ounces, fine, of a United States coining value of \$223,468,200 and of a commercial value of \$107,159,900. For the reasons stated above these figures are only approximations. A comparison of the preliminary figures for 1899 compiled last year with the corrected figures appearing in the present report shows a total difference of 0.2 per cent, with four countries to hear from. The aggregate silver production of those countries amounts to about 2 per cent of the world's output. An allowance must be made for the inaccuracy of the final official results obtained in most countries. A critical examination of the figures for 1900 leads to the conclusion that the deficiency is probably less than 5 per cent of the product of the world, except China, whose production is an unknown quantity.

The silver production of 1900 is the largest ever known, and exceeds four times the production of 1870, more than twice the production of 1880, and that of 1890 by 37 per cent. The increase over the previous year is more than 5,000,000 ounces, fine, more than one-half of which is due to the United States.

The following table shows the increase and decrease for 1900 as compared with 1899:

SILVER.

Country.	Increase in 1900.	Decrease in 1900.
	<i>Fine ozs.</i>	<i>Fine ozs.</i>
United States	2,882,500	
Mexico	1,825,718	
Canada	1,037,111	
Australasia	602,665	
Russia	8,412	
Austria-Hungary	93,521	
Germany		830,612
Norway	5,931	
Sweden		11,636
Italy		68,116
Spain	732,376	
Great Britain	35,091	
Argentina		346,705
Colombia		1,657,398
Peru	770,580	
Uruguay	155	
Central America	101,115	
Dutch East Indies	80,659	
Total	8,175,834	2,914,497
Net increase	5,261,337	

The following table shows, by calendar years, the production and value of gold and silver in the world since 1860:

PRODUCT OF GOLD AND SILVER IN THE WORLD SINCE 1860.

[The annual production of 1860 to 1872 is obtained from 5-year period estimates, compiled by Dr. Adolph Soetbeer. Since 1872 the estimates are those of the Bureau of the Mint.]

Calendar years.	Gold.		Silver.		
	Fine ounces.	Value.	Fine ounces.	Commercial value.	Coining value.
1860.....	6,486,262	\$134,083,000	29,095,428	\$39,337,000	\$37,618,000
1861.....	5,949,582	122,989,000	35,401,972	46,191,000	45,772,000
1862.....	5,949,582	122,989,000	35,401,972	47,651,000	45,772,000
1863.....	5,949,582	122,989,000	35,401,972	47,616,000	45,772,000
1864.....	5,949,582	122,989,000	35,401,972	47,616,000	45,772,000
1865.....	5,949,582	122,989,000	35,401,972	47,368,000	45,772,000
1866.....	6,270,086	129,614,000	43,051,583	57,646,000	55,663,000
1867.....	6,270,086	129,614,000	43,051,583	57,173,000	55,663,000
1868.....	6,270,086	129,614,000	43,051,583	57,086,000	55,663,000
1869.....	6,270,086	129,614,000	43,051,583	57,043,000	55,663,000
1870.....	6,270,086	129,614,000	43,051,583	57,173,000	55,663,000
1871.....	5,591,014	115,577,000	63,317,014	83,958,000	81,864,000
1872.....	5,591,014	115,577,000	63,317,014	83,705,000	81,864,000
Total.....	78,766,630	1,628,252,000	547,997,231	729,563,000	708,521,000
1873.....	4,653,675	96,200,000	63,267,187	82,120,800	81,800,000
1874.....	4,390,031	90,750,000	55,300,781	70,674,400	71,500,000
1875.....	4,716,563	97,500,000	62,261,719	77,578,100	80,500,000
1876.....	5,016,488	103,700,000	67,753,125	78,322,600	87,600,000
1877.....	5,512,196	113,947,200	62,679,916	75,278,600	81,040,700
1878.....	5,761,114	119,092,800	73,385,451	84,540,000	94,882,200
1879.....	5,262,174	108,778,800	74,383,495	83,532,700	96,172,600
1880.....	5,148,880	106,436,800	74,795,273	85,640,600	96,705,000
1881.....	4,983,742	103,023,100	79,020,872	89,925,700	102,168,400
1882.....	4,934,086	101,996,600	86,472,091	98,232,300	111,802,300
1883.....	4,614,588	95,392,000	89,115,023	98,984,300	115,297,000
1884.....	4,921,169	101,729,600	81,567,801	90,785,000	105,461,400
1885.....	5,245,572	108,435,600	91,609,959	97,518,800	118,445,200
1886.....	5,135,679	106,163,900	93,297,290	92,793,500	120,626,800
1887.....	5,116,861	105,774,900	96,123,586	94,031,000	124,281,000
1888.....	5,330,775	110,196,900	108,827,606	102,135,900	140,706,400
1889.....	5,973,790	123,489,200	120,213,611	112,414,100	155,427,700
1890.....	5,749,306	118,848,700	126,095,062	131,937,000	163,032,000
1891.....	6,320,194	130,650,000	137,170,919	135,500,200	177,352,300
1892.....	7,094,266	146,651,500	153,151,762	133,404,400	198,014,400
1893.....	7,618,811	157,494,800	165,472,621	129,119,900	213,944,400
1894.....	8,764,362	181,175,600	164,610,394	104,493,000	212,829,600
1895.....	9,615,190	198,763,600	167,500,960	109,545,600	216,566,900
1896.....	9,783,914	202,251,600	157,061,370	105,859,300	203,069,200
1897.....	11,420,068	236,073,700	160,421,082	96,252,700	207,413,000
1898.....	13,877,806	286,879,700	169,055,253	99,742,600	218,576,800
1899.....	14,859,285	307,168,800	167,577,533	100,546,500	216,665,700
1900.....	12,366,319	255,634,500	172,838,870	107,159,900	223,468,200
Total.....	194,186,904	4,014,199,900	3,121,090,612	2,768,119,500	4,035,349,200
Grand total.....	272,953,534	5,642,451,900	3,669,087,843	3,497,682,500	4,743,870,200

WORLD'S COINAGE 1898, 1899, AND 1900.

In the Appendix will be found a table, revised from the latest information received, exhibiting the coinages of the various countries of the world during the calendar years 1898, 1899, and 1900.

COINAGE OF NATIONS.

Calendar year.	Gold.	Silver.
1898.....	\$395,477,905	\$149,282,936
1899.....	466,110,614	166,226,964
1900.....	354,936,497	177,011,902

While the above figures represent, as accurately as the Bureau has been able to ascertain, the total value of the gold and silver coinage of the world during the calendar years 1898, 1899, and 1900, they do not accurately represent the value of the coinage from new material alone, but include the value of the recoinage of foreign and domestic coins and that derived from old material, plate, jewelry, etc., melted and used in coinage. Many foreign governments in their reports to the Bureau failed to separate the values of the coinage derived from these various sources.

The following table exhibits, by calendar years, the fine ounces and value of the gold and silver coinage of the world since 1873:

COINAGE OF GOLD AND SILVER BY THE MINTS OF THE WORLD FOR THE CALENDAR YEARS SINCE 1873.

Calendar years.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
1873	12,462,890	\$257,630,802	101,741,421	\$131,544,464
1874	6,568,279	135,778,387	79,610,875	102,931,232
1875	9,480,892	195,987,428	92,747,118	119,915,467
1876	10,309,645	213,119,278	97,899,525	126,577,164
1877	9,753,196	201,616,466	88,449,796	114,359,332
1878	9,113,202	188,386,611	124,671,870	161,191,913
1879	4,390,167	90,752,811	81,124,555	104,888,313
1880	7,242,951	149,725,081	65,442,074	84,611,974
1881	7,111,864	147,015,275	83,539,051	108,010,086
1882	4,822,851	99,697,170	85,685,996	110,785,934
1883	5,071,882	104,845,114	84,541,904	109,306,705
1884	4,810,061	99,432,795	74,120,127	95,832,084
1885	4,632,273	95,757,582	98,044,475	126,764,574
1886	4,578,310	94,642,070	96,566,844	124,854,101
1887	6,046,510	124,992,465	126,388,502	163,411,397
1888	6,522,346	134,828,855	104,354,000	134,922,344
1889	8,170,611	168,901,519	107,788,256	139,362,595
1890	7,219,725	149,244,965	117,789,228	152,293,144
1891	5,782,463	119,534,122	106,962,049	138,294,367
1892	8,343,387	172,473,124	120,282,947	155,517,347
1893	11,243,342	232,420,517	106,697,783	137,952,690
1894	11,025,680	227,921,032	87,472,523	113,095,788
1895	11,178,855	231,087,438	98,128,832	126,873,642
1896	9,476,639	195,899,517	123,394,239	159,540,027
1897	21,174,850	437,722,992	129,775,082	167,790,006
1898	19,131,244	395,477,905	115,461,020	149,282,936
1899	22,548,101	466,110,614	128,566,167	166,226,964
1900	17,170,053	354,936,497	136,907,643	177,011,902
Total	265,382,269	5,485,938,432	2,864,153,902	3,703,148,492

REPORTS OF THE SPECIAL AGENTS OF THE BUREAU OF THE MINT
ON THE PRODUCTION OF THE PRECIOUS METALS IN 1900
IN THE SEVERAL STATES AND TERRITORIES.

ALASKA.

By CHARLES G. YALE.

It is necessary in ascertaining the gold and silver output of Alaska each year to depend entirely upon the statements of receipts of Alaska bullion at United States mints, at assay offices, and private refineries and smelters to make any "distribution" or apportionment of the relative amount produced by any separate district or camp. The population of the placer camps along the Yukon River and its tributaries and on the coast of Norton Sound varies greatly with the season, comparatively few men remaining during the winter. Most of the work and all of the gold washing is done in the summer months when the water is flowing and no ice interferes with operations. Large numbers of miners leave these camps each fall to return in the spring, so it is found impracticable to obtain results of individual operations in the more distant places where mail communication takes much time and is infrequent.

It is possible, however, to approximately apportion the amount of gold derived from the placers and that from the quartz mines, for the reason that all the quartz mines in active or productive operation thus far are on Douglas Island and other parts of south eastern Alaska, and on Unga Island, where there is regular communication all the year round and where work is continued throughout the year. Moreover, these quartz mines are operated by companies which have regular offices, and direct returns are received from them as to their output annually. On receiving these returns and deducting the aggregate from the total output of Alaska, it is seen how much comes from the placer camps, though, for the reasons previously stated, it is difficult to ascertain with any exactness the output of any particular camp. An attempt has been made, however, to ascertain approximately the amount yielded by Nome and adjacent placers. With the total of the Nome output added to that of the quartz mines, it is seen what gold has come from all the other scattered camps, such as Minook, Circle City, the Koyukuk, Porcupine district, etc.

The following table shows the gold and silver product of Alaska for the calendar year 1900:

STATEMENT OF BULLION OF ALASKAN PRODUCTION RECEIVED AT UNITED STATES MINTS AND ASSAY OFFICES AND PRIVATE REFINERIES AND SMELTERS DURING CALENDAR YEAR 1900.

Metal.	Standard ounces.	Coining value.
Gold	438,932.58	\$8,166,187.46
Silver	83,131.24	96,734.50

As the entire gold product of Alaska in 1899 was \$5,602,012, it is seen that there has been for the year an increase of \$2,564,175 in the output of that metal. This large proportionate increase is due almost

entirely to the output of the gold fields at Cape Nome and vicinity. The silver output shows quite a marked falling off. At the United States mints and assay offices some increase in silver is shown, but the returns from private refineries and smelters are very much less than in the previous year.

In comparing the direct returns received from the large quartz mines on Douglas and Unga islands with similar ones of the previous year, it is found that there is a decrease of \$343,287 gold in 1900. Some of the smaller quartz mines in southeastern Alaska showed a slight increase in their product, but not enough to make up the deficiency stated.

Returns from the quartz mines show a total product for 1900 of \$2,089,818. From the Nome fields, according to returns to mints, assay offices, and refineries, there came \$5,100,000 gold. This leaves the sum of \$976,369 as the total output of all the rest of Alaska, including some placers in southeastern Alaska, a few quartz mines which made no returns, the various camps on the Yukon River and its tributaries, Cook Inlet, etc. Gold from some of the camps outside of Nome, along Norton Sound, or, for instance, those to the westward of Nome, as well as Golofnin Bay mines, is doubtless included in the figures for Cape Nome, the shipments having been made from that point.

The Lituya Bay beach-sand mines were not worked in 1900, and comparatively little came from the beach-sand claims at Nome.

It is conceded by all who return from Cape Nome—now the most important mining camp in Alaska—that the unfortunate legal complications which arose there during the season of 1900, resulting in many claims being placed in the hands of a receiver, very greatly retarded development and restricted production. On numbers of claims known to be rich no work was done for fear of litigation, and the season was a disastrous one for many miners. All this has since been remedied, however, and the camp will soon reach its full productive capacity.

Moreover, the conditions for the future are more promising, since a better class of men, generally speaking, will make up the population. The thousands of people with no knowledge of prospecting or mining, who were attracted by the possibilities of sudden wealth, will be greatly lessened in numbers, and those who remain will be of a class better calculated to develop the country.

Numbers of new creeks carrying gold in their beds were found during the season of 1900, but the extent of their richness remained to be proven in the following year. All the way round the coast to Bering Straits, and far back into the interior, the struggling army of prospectors took up the search for gold. A number of new and smaller camps were established where some active work was done, but in most instances only preparations were made for productive work in the following year.

Strikes almost without number were reported in many directions from Nome, and in a few places it was predicted that active work would show even more favorable conditions than prevailed at Nome itself. The season of 1901 will prove or disprove these assertions.

Over in Golofnin Bay district, on the tributaries of the Fish River, notably on Ophir Creek, considerable development work was done and more or less gold taken out. Some machinery was brought in, reservoirs built, ditches dug, and preparations made for working on a more extended scale the following season. Some very good "bench

diggings" up on the sides of the canyon above the bed of Ophir Creek have been opened and worked profitably. Quite a camp has now grown up at Council City, on Fish River, which is the center of that district.

Farther along the coast from Cape Nome and toward Port Clarence and Cape Prince of Wales seemed to be the region of the most active prospecting, and some very good diggings were found, rather too late in the season, however, to make much product. No beach diggings as extensive as those at Nome were found, though a few isolated rich spots were discovered and worked. South of St. Michael, where the Kuskokwim River empties into the Bering Sea, new diggings were reported, but little definite is yet known of them.

Up toward the head of the Koyukuk River, one of the large tributaries of the Yukon, diggings were worked with but indifferent success, though much was expected of them.

In that region are large banks of auriferous gravel, which, miners report, would pay handsomely to work by hydraulic process, but as yet no hydraulic plants have been established or ditches dug to bring water on the ground. In view of the short water season in that far northern region, which is up in the Arctic Circle, it is doubtful if any extensive operations for hydraulicking will ever be undertaken. Some gold was taken from the bars on the main river and smaller branches, but not in any large amount.

The camp of Minook has a few claims which are reported as yielding well, but hundreds of claims, located when the camp was first found in 1897, have not been worked and have been practically given up, the men having left for richer diggings.

So much attention has, in fact, been given to the region around Nome that the diggings at Circle City, Minook, Koyukuk, etc., have attracted comparatively few prospectors or miners. Much is expected in the season of 1901 for the Bluestone and Kongarok districts, especially the latter.

In the Turnagain Arm district, Cooks Inlet, where there was great excitement before the discovery of the Nome fields, some profitable work was done in the fall of 1900, a particularly rich strike having been made on Bear Creek, one pocket yielding largely. There were several strikes made in the district on streams supposed to contain no gold, but which are now paying.

On Douglas Island, southeastern Alaska, the quartz mining and milling operations are on as extensive a scale as in any place in the world, though the grade of the ore is low. With water power and stamp mills of large capacity ore worth only about \$2 is made to pay. The three large mines on the island, which are under one management, though in separate companies, employ 805 men, and in 1900 crushed and treated at their mills 912,447 tons of ore, or over 76,000 tons monthly throughout the year.

STATEMENT OF BULLION OF NORTHWEST TERRITORY PRODUCTION RECEIVED AT UNITED STATES MINTS AND ASSAY OFFICES AND PRIVATE REFINERIES AND SMELTERS DURING CALENDAR YEAR 1900.

Metal.	Standard ounces.	Coining value.
Gold	1,205,054.943	\$22,419,626.85
Silver	296,810.03	345,378.94

YUKON TERRITORY.

CONSULAR SERVICE, U. S. A.,
Dawson, Yukon Territory, July 12, 1901.

GEO. E. ROBERTS, Esq.,
Director of the Mint, Washington.

DEAR SIR: Estimates made at Dawson as to the output of gold are always over-estimated. At this consulate it is only an estimate I can arrive at, as many carry out the gold dust with them without consular invoices, and the customs inspector at the boundary can not find out.

When one quotes the season's output they refer to the amount of gold that will be taken out in the twelve months. Our record of invoices show only \$18,000,000 sent out last year, yet over \$20,000,000—I think \$22,000,000, according to the assay office reports—went from the Klondike.

This year's or season's output of gold from the Klondike I think has been over-estimated. Earlier reports said \$25,000,000 to \$30,000,000; \$20,000,000 will be nearer the mark.

Yours, truly,

J. C. McCook, *United States Consul.*

ALASKA.

The report of the Alaska Treadwell Gold Mining Company shows that the stamp mills crushed in the year ending with May last 457,802 tons of ore from which the average recovery was only \$1.88 per ton. This is the lowest average yet recorded in any one year, but the working cost was only \$1.05 per ton, and from the profit balance of 83 cents a ton satisfactory dividends were paid.

ALASKA.

[Cabell Whitehead, Ph. D.]

During the year 1900 no section of the United States held the attention of the mining public in the same measure as has the district of Alaska. Up to the time of the discovery of gold on the Klondike only a few hardy and adventurous miners had dared to enter this frozen and inhospitable region, as it was believed to be at that time, and their harrowing tales of long nights and bitter cold deterred the less adventurous from following their example. Previous to the discovery of the Klondike mining had been carried on in a small way at Forty Mile and at Rampart, and a number of other points along the Yukon River, but the number of miners in Alaska probably did not exceed 200 or 300. With the discoveries in the Klondike followed the stampede of 1897 and again in 1898, and, as always in such cases, more people sought employment than was offered, and the overflow drifted back down the Yukon to the old mining camps at Circle City and Rampart. Later on these wanderers crossed over into the Koyukuk country and explored that, with only partial success, and went on to the Seward Peninsula, where they met the Swedes. Here they met rich strikes at Nome, Golovin Bay, Port Clarence, and yet, not content with this, during the fall of 1900 parties fitted out at Nome for the purpose of exploring the Kuskokwim, that large river which empties into the ocean south of the mouth of the Yukon, at Bristol Bay. This stream has been explored almost from its source to the ocean, and while there have been frequent rumors of rich strikes, so far as known nothing of value has been found except on the headwaters of the South Fork, which penetrates almost into the Copper River country. Strikes were reported there last fall and have been verified this spring, but the extent and value of these discoveries can not be known for another season.

On the Kuskokwim, in reviewing the mining situation, we naturally pass over to the Copper River country, where we find little gold, but copper in enormous quantities. This stream flows south, its headwaters being not far distant from the Yukon, and also in like proximity to the Tanana, that stream of great promise and small yield. In this section of Alaska it is copper we look for rather than gold. Unfortunately, these deposits, or the most promising of them, are located about 150 miles inland, and the fact that the Copper River is not a navigable stream, it being filled with rapids in its lower windings, makes this immense wealth unavailable without railroad facilities. It is therefore unnecessary to speculate upon its value at present or its future production. When a railroad is built from Vades to Eagle City (which is necessary both as a means of communication between the seacoast and the interior of Alaska as well as the development of these properties) the investing public will seize upon this immense storehouse of wealth with avidity. The only mine in this section of Alaska which has produced any copper is a mine located on an island in Prince William Sound. This mine during the past year has been a shipper of rich copper ore, and promises in the near future to develop into a large producer.

From Prince William Sound, in an easterly direction, we come to Juneau, which is the center of the gold-mining interests in southeastern Alaska. Not far distant, on Douglas Island, is the Alaska-Treadwell, one of the largest low-grade free-milling gold mines in the world, while on the mainland are a number of exceedingly promising properties, all developed within the past few years. That this country should attract the attention of capital is without doubt, and that in the near future. Farther south we reach Prince of Wales Island and Ketchikan. On Prince of Wales Island are located some of the most promising copper mines in the entire country, and with the cheap water freights which they are able to obtain it is more than probable that in the near future these mines will become large producers, with the necessary smelting works located either there or at some point along Puget Sound. Gold mines at Ketchikan have not been large producers. The ore is very rich, but there is some question as to the amount, and further development work will be necessary before an idea can be formed of their worth.

The production from all the points named appears in the returns from smelters, as the bullion from the Treadwell mine and its neighbors is shipped to the smelter in San Francisco, while the concentrates are shipped to the Tacoma smelter, and will appear in their reports.

Last year by far the greatest number of miners were attracted to the Seward Peninsula by the rich strikes at Nome, and I shall endeavor to give in some detail the result of my observations there during the summer of 1900.

SEWARD PENINSULA.

The discovery of gold in 1898 in Seward Peninsula, followed by the wonderful tales of the returning miners in the fall of 1899, attracted to this district a mighty horde in the spring of 1900, which in itself, to the careful observer, foreshadowed disappointment and failure as plainly as did the hundreds of thousands of dollars invested in machinery which was rushed aboard the ships at Seattle and taken to Nome for the purpose of mining ground in no way adapted to its use. The first steamer that reached Nome was the *Alexander*, a small vessel of light draft, which arrived there on the 23d of May. A few days

later a number of whalers and one small passenger vessel anchored in front of the town. Then followed in quick succession the large passenger boats until by the 1st of July the total number of vessels off Nome numbered 50. Each of these boats was loaded to its full capacity and in many cases far beyond. Of the total number of people to disembark, between twenty-five and thirty thousand, there were probably one or two thousand who were familiar with mining in the ordinary sense and a very much smaller number were practical miners. The impression prevailed among these passengers that it was only necessary to go upon the beach and work for a few days and return to their homes rich. This dream was dissipated soon after their arrival, for at the time of our arrival, June 17, the beach had practically been worked out, and it was impossible for a skillful miner to make more than wages. When this was recognized the first boats returning to Seattle took back from one-third to one-half of the original number of passengers that were brought up. This was very fortunate for the community, as at that time Nome had only sufficient houses to shelter about 3,500 people. The majority of the people who landed, landed without blankets, tents, or food. It seemed never to have occurred to the average fortune hunter that his supplies, stored away in the hold of the ship, would be a week or ten days reaching him after he had landed, and while many cases of pneumonia naturally resulted, only the fine weather prevented the death of thousands. It is hard to picture the conditions existing at Nome during the last weeks of June. If you can imagine 25,000 people turned loose on two miles of beach with goods piled up as high as houses in many places, all semblance of streets lost in goods and tents, thousands struggling to gain possession of their belongings, combined with the vain efforts of the steamship people to protect their goods and get receipts for what was delivered, you have a faint idea of the conditions at Nome in June and July, 1900. Provisions of all kinds were high at this time and sleeping quarters in a tent were scarce at from \$1 to \$2 per night. Teams found ready takers at \$10 an hour, which included blockades. The ships arriving were well supplied with lumber and in a few weeks, working day and night, houses enough were built to take care of all who remained. The fact that there was practically no night—it being possible to read at any time of night through June and July—facilitated work of all kinds.

After the exhaustion of the beach the miners in the community immediately started for the creeks, and as most of these had been staked the previous year, many of them began working for wages and settled down to the ordinary existence of laborers. The majority of those unacquainted with mining remained around the town until well along in the season, when some of them returned on money supplied by friends, while large numbers were taken out on Government transports as indigents.

With this brief view of the opening of the season of 1900, I will endeavor to describe without technicalities the general conditions and methods employed in securing the gold in this frozen country. The Seward Peninsula juts out toward Asia, and has as its extreme western limit Cape Prince of Wales. It is about 325 miles long by 100 broad, and may be divided into six mining districts, the Arctic, the Cape York, the Port Clarence, Nome, the Kougarok, and the Council City. Gold was first discovered along the rivers in the Council City district, not far from the present Council City. The second discovery was made on Anvil Creek, in the Cape Nome mining district about

one year later, and still later discoveries were made along the Kougarok River.

The discoveries at Port Clarence were made last July and August, while the reports from the Arctic district came in late last fall, and only began to attract attention this spring, when the truth in regard to these discoveries began to leak out.

As the conditions prevailing are almost identical in each district, we will take the Nome district as typical of the whole gold field.

What are known as "beach claims" are simply the points at which rivers or small streams empty at present or have emptied at some time into the ocean, bringing down the fine gold from the placers above, which has in turn been thrown back by the wave action, and the lighter material carried off. The gold, black sand, and garnets, or "ruby" as it is called by the miner, concentrates into layers. These layers ("pay streaks") are from one to three in number, and vary in thickness from one-quarter to two inches. In places they are very rich, as was the beach at Nome, above the present mouth of Snake River, and at a point formerly the mouth of Snake River. Again, at Topkok we have the same condition. Here Daniels Creek, a small stream, empties into Bering Sea, bringing down gold from above, and the waves in turn have concentrated it to such an extent that many miners in the early spring months of last year took out from \$10,000 to \$15,000 with a single rocker. These diggings soon became exhausted along the beach, and only those who were fortunate enough to have claims on the creeks have anything to work the coming season. It is my belief that these beach diggings will be discovered all along Bering Sea, but their extent and richness are always uncertain, and it is doubtful if such profitable claims as those at Topkok and Nome will be discovered between Port Clarence and Golofnin Bay, as this beach has all been very thoroughly prospected.

The tundra claims, which attracted much attention and sold for high prices in New York a year ago, have, in ninety-nine cases out of a hundred, proved to be worthless, as they are only of value when they cover the bed of an old stream. These claims might properly be called beach claims, as this term is applied generally to any claim upon which there is no water or which are above the present water level of the adjacent streams. The pay streaks on the creek claims are shallow, seldom exceeding more than three or four feet in depth, with a bed rock of clay or decomposed schist, and there is every indication that these placers resulted from a secondary movement of gold which was formerly laid down in the beds of prehistoric rivers, whose general course was from east to west and not north to south, as is the general trend of the rivers on the peninsula.

A striking illustration of this point is the fact that Kikola Gulch, which is a dry gulch and crosses Anvil Creek at No. 11, above Discovery, has been proven beyond a doubt, I think, to be an old channel, and that above this point Anvil Creek, which is by far the richest creek in the entire district, contains no gold, while below this point each claim is rich down to No. 3, below Discovery. This channel has been traced by sinking pits almost to Dexter Creek, and although there may be some doubt as to its being a continuous channel there can be no doubt that the gold in the present creeks was derived from this source. Beyond Dexter Creek there are evidences that it continues and supplied the gold in Bourbon Creek, Dry Creek, Extra Dry and Otter Creek, as well as gold in the rich Newton Gulch. At present this theory is not susceptible of positive proof, though it is my belief

that the work of the past winter in addition to what will be done this summer will fully demonstrate its correctness. The natural result of or belief in the existence of these old channels was to stimulate enormous explorations on the benches, and even at the time of my leaving Nome, last fall, many thawing machines and other devices for sinking prospect holes in the tundra were being gotten into position, and the coming season will open up many rich claims. Next fall the system of drift mining or winter diggings, which has been in vogue at Dawson for several years, will be fairly launched. The future of Nome depends largely upon such discoveries, as the present creeks will be exhausted in a comparatively short time.

METHODS OF MINING.

The mining on the beach was the simplest operation possible, a rocker being all that is required in addition to a shovel and a pick and a good strong back. The dirt was shoveled up and thrown onto a coarse screen, which removed the larger stones and trash, the latter derived from the driftwood, etc., from the sea. The fine dirt passes over a series of riffles, which are small obstructions, and is finally washed off, leaving the heavy gold. In some cases the tailings passed over a small piece of carpet or burlap; in other cases an amalgamated silver plate was used, but in each case the object is the same, viz, to catch the fine gold. The heavy particles of gold are caught in the riffles, while the fine either amalgamates or is retained by the carpet, while the lighter material or tailings is washed away. In the final cleaning up of this gold a large amount of black sand and garnets is obtained, and it was a prevalent belief among the miners, and even among people who should have been able to demonstrate the fallacy of it, that this black sand was an ore of gold, and contained the metal in paying quantities, and schemes for saving this sand and shipping it out to the smelters were innumerable. I have investigated this matter very closely, and can state positively that when the black sand and garnets are carefully separated from the free gold these materials contain not one trace of the precious metal. They are simply the associates of the gold by virtue of their high specific gravity. The same process which concentrated the gold also collected these minerals. I may mention, however, that there is found in certain creeks in this district, especially Snow Gulch and Upper Anvil Creek, a considerable amount of the mineral scheelite or tungstate of calcium, and that this mineral is gold bearing, assaying from \$50 to \$250 per ton. It does not, however, occur on the beach, and only in a few of the creeks.

In opening a creek claim the miner usually goes to the lower end of his claim and puts in what is called a bed-rock drain; that is, a ditch dug on the bed rock to carry off all water from the bed of the creek after the upper creek has been drained and a ditch dug at the side of the claim, into which he turns the water from its natural channel, leaving the bed exposed. He then runs what is called a "cross cut"—that is, a ditch at right angles to the course of the creek—and by carefully prospecting and panning the gravel from this ditch he manages to locate his pay streak or the channel which the stream occupied at the time the gold was being laid down, and I might remark that this is not always the present channel of the creek. When he has once located the pay streak he begins mining operations in earnest.

As the whole country is overgrown with tundra and is in reality a

peat bog, it is necessary to strip this off down to the gravel, which is usually frozen at the beginning of the season, but soon thaws under the influence of twenty hours of sunshine per day. This tundra is usually from 6 to 18 inches deep, but sometimes even 3 feet. When this is removed and the gravel exposed he erects his sluice boxes, which are usually only square troughs, made of inch and a half lumber, in the bottom of which are placed his riffles or obstructions, and behind which the gold, being the heavier material, collects. These sluice boxes are made in 12-foot sections, and a complete sluice is usually from 25 to 50 feet long, depending upon the amount of lumber at the disposal of the miner and also upon the fineness of the gold. The water is now turned into this trough and the fall adjusted according to the material to be handled and the condition of the gold, the coarser the gold the greater the fall. Into this stream of water the miner shovels his pay gravel. The water carries off the larger rocks and also the lighter material. The black sand and gold accumulate behind the riffles, while the lighter material is dumped out at the end of his sluice box and is known as "tailings." These are shoveled away from time to time as they accumulate. This operation goes on until the miner judges that his riffles are filled to a point where there is danger of gold being taken over with the tailings, when he turns a portion of the water off and removes all the materials left in the box by careful stirring. By carefully panning the remaining material he frees it from the heavy sands which are associated with it. Usually it is necessary to use a magnet or other device for thoroughly cleaning it. Every miner has a different method and is a firm believer in his own. The gold when dried usually contains about 10 per cent of foreign matter and is known as "dust." This is placed in gold bags, which are made of deerskin or sheepskin, and brought to market. It is rather a curious thing that in melting gold containing scheelite, referred to above, the carbon of the crucibles reduces a small amount of tungsten, which unites with the gold, forming an alloy which segregates badly and is difficult to assay. The tungsten, however, is easily removed by the addition while molten of a small amount of alkali, such as sodium hydrate and niter.

MINERALS OF THIS PENINSULA.

The rocks of this peninsula are mica schist, lime and granite, with more or less quartz. The minerals I have been able to identify here are pyrite, arsenopyrite in large quantity, especially at Topkok. Stibnite, native mercury, cinnabar, bismuth, as well as the oxides of iron. Arsenopyrite is more or less gold bearing, but I have not found gold in paying quantities. In a number of creeks throughout the district, and especially in Dewey Creek, native mercury is found combined with gold, forming a native gold amalgam. This fact has given rise to reported discoveries of platinum in a number of creeks, but with a single exception it has always proved to be mercury.

On Mountain Creek, which is a tributary of Oregon Creek, in the Cape Nome mining district, I have found native bismuth in considerable quantities. It occurs as rounded nodules and accumulates in the sluice boxes along with the gold. It frequently carries as much as 5 per cent of gold. As a result of its presence the gold from this locality is always brittle. Iron ores are quite common, generally slightly magnetic. Professor Brooks showed me a number of fine specimens of cassiterite, dioxide of tin, obtained by him in the Cape York mining district.

The outlook for quartz in the immediate vicinity of Nome at present is not good. It is possible, however, that when the mountains which lie back of Nome have been prospected thoroughly quartz mines may be found, but at present there is nothing which warrants the outlay of capital anywhere in that district.

COUNCIL CITY DISTRICT.

The Council City district is the oldest district in the peninsula. The first discoveries in this district were made by the Swedish missionaries, probably on Ophir Creek.

When gold was discovered on Anvil Creek the fabulous stories of its richness caused a stampede from the Council City district and left it almost entirely in the hands of a few practical miners who had faith in its future. During the past season the miners who came into the Nome district, finding it all taken up, crossed over into the Council City district and made many valuable locations, which were profitably worked last season and will be large producers the coming season. It is my opinion that the best placer mines on the Seward Peninsula are to be found in this district and I have great hopes of the future. Below I give an estimate of its production for last year. The principal rivers of the district are the Fish, Neukluk, and Fox rivers.

Up to the present time no valuable strikes have been made on Fish River. The most prominent producers in the district are Ophir Creek, including Crooked Creek and Sweetcake, which is a tributary of Ophir, and Ophir, in turn, a tributary of Neukluk River. Ruby Creek, a tributary of Kass-de-pogre, has also produced well. Topkok, with Daniels and Ryans creeks, are also located in this district, and were large producers.

The Bonanza district, which is a portion of the original Cape Nome district, has one or two promising rivers. Solomon River and Shovel Creek were regarded at the beginning of last season as most promising territory, but development in that locality was rather disappointing, so it is probable that there are but few good claims in this district. The production last year was very small compared with the amount of work done there.

In the Nome district Anvil Creek has been the greatest producer by far, producing last year from 13 claims \$1,750,000. Other rich claims in this district are Snow Gulch and Glacier Creek. One claim on the former produced \$500,000; the two creeks together produced about \$750,000. Dexter Creek, which empties into the Nome River and is over the watershed from Snake River and Anvil Creek, produced about \$300,000. Dexter is almost a dry creek and has to be worked with rockers; on some of the claims it was necessary to haul water for rocking, yet the ground is exceedingly rich and has paid very handsomely. Extra Dry Creek has two rich claims. Dry Creek, just across the divide from Nome River, is probably on the whole the most promising creek in the district. The claims were not opened until last season and only a few of them then. The amount of gold produced while not great (about \$25,000) came from a number of claims and was chiefly obtained while doing development work. The coming season, I believe, will demonstrate this creek to be very rich. Newton Gulch, which is a tributary of Dry Creek and undoubtedly derives its gold from the same source, has a number of very valuable claims; one fraction of a claim exceeding in richness anything known

in the district. From a single pan of dirt \$140 was taken, and ten pans of dirt produced \$440, while six cubic yards of dirt, the total amount worked last season, as it was struck late in the fall, produced \$6,000, a record which it would be difficult to beat anywhere in the known world. Bourbon Creek, also a tributary of Dry Creek, will prove a steady producer during the coming season, though its production was only about \$5,000 last year. Saturday Creek, a tributary of Anvil Creek, flowing along the base of Anvil Mountain, is very promising. Its production was about \$10,000. The two claims on Nikola Gulch referred to above, the Mattie and Daisy, are said to have produced \$115,000 and \$30,000, respectively. Oregon and Hungry creeks, with Mountain Creek, have a number of very promising prospects, but so far no serious work has been done on these creeks, all of these claims having been more or less involved in litigation during the past season. I estimate the production of the three at \$50,000. During the month of July a number of beach miners left Nome and wandered up the coast to Sheas road house, a point about 60 miles west of Nome. There they crossed the mountains and came down onto Gold Run, a tributary of Bluestone River. These men located claims near the mouth of Alder Creek. Other prospectors, coming in by way of Port Clarence and Teller City, located along the Bluestone River, and still a third party, coming in higher up on Gold Run, made still another location known as Swansons Discovery, so that along the Bluestone River and its tributary, Gold Run, there are four distinct discoveries, each discoverer believing that he was on an unknown stream. This has caused more or less confusion in the Port Clarence district records, but is now being straightened out and the claims renumbered. The wonderful richness of two of these claims, No. 9, Gold Run, and No. 7, Gold Run, as well as several claims on Alder Creek, has attracted the attention of the entire Peninsula. With only 12 feet of sluice boxes, four men took out of No. 9 \$20,000 in one month, and at no time was bedrock reached, as the work was done very late in the season. Nothing is therefore really known of the true value of the property; yet this record alone would place it in the lead among all the discoveries of last year. A large number of practical miners looked the country over last fall, and many of them will return the coming season, and it will be surprising, indeed, if this locality does not add a very large sum to the total output of the Peninsula. Just about the close of the season discoveries were made on Wheeler Creek and a number of other creeks to the east of Gold Run. No positive information can be obtained as to their value, and a year's work will be necessary to demonstrate it.

Across to the north of the salt lake which empties into the ocean at Port Clarence is the Agepuk River and its tributary, the American River. This country was unknown territory at the beginning of last season, but many prospectors reported it as very promising. The Kougarkok district includes the two rivers Koosetream and Kougarkok, also Garfield and Quartz creeks, which are said to be exceedingly promising, but nothing can be known positively before next fall. I estimate the production of this district last year at \$50,000.

The Arctic mining district was formed late last season and is on the tributaries of the American River, which flows north and empties into Good Hope Bay. This district should attract some attention from the fact that it is the first discovery of gold on the north side of the watershed. All of the streams up to the present time which have given any promise have had a general trend in a southerly direction.

The United States revenue cutter *Bear* brought out a number of stranded miners from the Kotzebue Sound country last fall. These men had wintered on the headwaters of the Noatok River, and while they had discovered little gold, still the gold which they brought out, only a few ounces, was very coarse, and they reported very promising prospects. The most interesting fact was that they brought out with them about 50 pounds of native copper, which they claim to have gotten from the bed of the streams in that locality. I examined this copper for gold and silver, but it was practically free from both of these metals.

The Cape York district, which forms the western extremity of the Peninsula, was regarded as very hopeful territory at the beginning of the past season, but nothing was developed there by the work of the season, and, with the exception of one or two claims, it does not seem to give very much promise. However, the discovery of tin in that locality may open a new field of industry which in the end may prove fully as profitable as gold mining.

The following is the estimate of the output of the Peninsula by creeks. This is only an approximation and is not regarded as reliable, simply being given as an indication of the distribution of the gold throughout the Peninsula:

Anvil Creek.....	\$1,750,000	Gold Run, in Port Clarence	
Glacier and Snow gulches ..	750,000	district	75,000
Dexter Creek.....	300,000	York	2,000
Nome Beach.....	350,000	Kougarok district.....	50,000
Extra Dry Creek.....	15,000	Elkhorn Creek	30,000
Dry Creek.....	25,000	Crooked Creek.....	50,000
Newton Gulch.....	10,000	Cold Bottom	1,000
Bourbon Creek.....	5,000	Ophir and Sweetcake creeks ..	100,000
Saturday Creek.....	10,000	Solomon River country	5,000
Nikola Gulch.....	145,000	Kotopogra	25,000
Oregon, Newton, and Hun-			
gary creeks	50,000	Total	4,588,000
Topkok and Daniels Creek,		Miscellaneous	162,000
including the beach	800,000		

The total production of the Seward Peninsula, made up from reports received by the refiners, mints, and assay offices, was \$5,100,000. By a careful series of calculations, based upon the average fineness of gold from the Klondike and Cape Nome gold compared with the total average fineness of all the gold received at the mints and assay offices, I am of the opinion that of this \$5,100,000 about \$350,000 originally came from the Klondike. In the spring of 1900 a large number of miners came down the Yukon River, arriving at Nome about February. These men all had gold in their possession, and many of them large sums. In addition to this, the transportation companies handled more or less of the dust from the upper country, and this was finally shipped out as Nome dust. The average fineness of the gold of the Seward Peninsula is about 890, while the average fineness of the Klondike gold is only 780, or a difference of over 100 points. If we consider the average fineness of all the gold received at the mints and assay offices with these facts, it is easy to estimate approximately the amount of the lower grade of gold, and my figure of \$350,000 was derived in this way. I submit it for what it is worth. There can be no question but that a large amount of gold came in from the Klondike, and I think that the Klondike production for 1900 should be credited with that amount and the same deducted from the production of the Seward Peninsula.

In conclusion, for the benefit of the investing public, as well as for the ultimate good of the mining interests of the entire peninsula, I would state that while the pay dirt is very widely distributed, and in many places exceedingly rich, yet the depth when compared with the gravel banks of California and other fields in the United States, is small. The average depth of pay dirt in the Cape Nome district is about 2 feet. This gravel is thawed out by an exposure to the sun and can be very easily handled with the shovel. The country is flat and there is practically no dump, which would be a serious drawback to hydraulic mining, even if there were sufficient dirt to handle in this way. I think it therefore wise for capitalists to consider carefully any very large outlay of capital in this district. It is essentially a "poor man's diggings," where a man who understands his business and is willing to work ought to be able with average luck to make from five to ten thousand dollars a season, and has a chance of making a great deal more. The country is to a certain extent spotted, as the miners call it—that is, the gold is not evenly distributed and claims should be very carefully prospected before large prices are paid for them. The outlook for the coming season is exceedingly bright, and I believe that the next season will see the product doubled, as did the past over the previous year. In a rich country, so little prospected, it is very hard to predict the future. Any day may announce the discovery of a new camp exceeding in richness anything that we have known before, so that my predictions are entirely based on what exists to-day.

STOPING WITH MACHINE DRILLS.

BY B. L. THANE, SUMDUM, ALASKA.

[From Transactions of the American Institute of Mining Engineers, Vol. XXIX, pp. 770-776.]

Within the past few years the mining industry has taken a new impetus in all its branches. New mines are being opened every day, while old ones, which have been either working at a loss or have been compelled to shut down, are now gradually being reopened and placed on a paying basis.

This growth and new life is due, in a measure, to the discovery of new mining districts, but the most important cause of the progress is the wonderful advance that has been made in all branches of mine engineering.

By means of the important inventions and discoveries that have been made in mechanics, chemistry, and electricity, we are now able to work ores which only a short time ago would have been regarded as worthless. We find, for instance, the electrician eliminating two of our greatest difficulties, those of distance and superior elevation, while the mechanic has brought to the highest degree of perfection not only ore-crushing and hoisting machinery, but all such devices as pertain to the mechanical handling of ores, and at the same time the metallurgist, with his combined chemical and mechanical skill, has helped us to extract the precious metals from the most refractory of ores.

But when we turn to examine methods in actual use for mining or breaking ore we are surprised at the small amount of progress that has been made in this direction. In the handling of the ore after it is broken almost everything has been done to reduce the operation to its simplest and cheapest mechanical form, and every form of engineering skill has been brought to bear upon the problem. But the work of the engineer usually ends with the erection and installation of the machinery that he has designed. His interest rarely reaches to the details of breaking ore: this is supposed to be the peculiar province of hand labor. This branch of the business is usually under the immediate supervision of men risen directly from the ranks, who have learned to do exactly what was done before them, and assuming, without question, that this is the only method, have bent their energies toward bringing that method to the highest degree of perfection.

There is no intention of denying the value of such work; for it is done well, and the energy, system, and skill with which it is carried on are all of the highest order.

But this does not prevent one who has marked the revolution which mechanical devices have wrought in other branches of mining from wishing to see the proper appliances brought to bear upon the problem of breaking ore.

The use of power drills in stoping is one of the methods that have been proposed to solve this problem. Although their use for this purpose is not new the method has not, in my opinion, received the consideration that it merits. We find the big machine in the shafts, tunnels, and drifts a decided success, and in use almost everywhere; but when we look for the little one in the stopes and on the vein we find instead the miner with his hammer, pounding away, just as his fathers did before him. Perhaps I should make some exceptions here, and mention what has already been done in this line, but it has been so little, especially in this country, that it is hardly worth mentioning.

Attempts have been made from time to time by enterprising men to use machine drills in stoping. Most of these, for one reason or another, have resulted in failures; and failure once made is sure to be heralded far and wide, only to be lived down by the slow growth of success.

It was the failure, or rather the repeated failure and final success, of one of these attempts, which I personally witnessed, that led me to become personally interested in this subject; and as it bears directly upon the question before us I will endeavor to give a brief outline of my experiences and their results.

While working underground in the Chief Mine, at Sumdum, Alaska, I had the good fortune to be placed as helper, or "chuckman," on one of the small machines, known as a "Baby Ingersoll." It was used for stoping and raising on the vein. This work presented an excellent example of the problem before us, as the vein varied from 1 to 3 feet in width (the most unfavorable for machine work), and the place of working was one of great difficulty, as it lay along the shaft, making any mistakes dangerous and costly. Thanks to my partner, who was a machine man par excellence, no such mistakes were made.

This was the fourth attempt to use the little drill at the mine and the first to register a success. My partner, who was a late arrival from the Cœur d'Alene, had found the little drill thrown aside in disgrace and covered with rubbish. But he knew what it could do and begged to be allowed to give it one more trial.

Of course it is out of the question to use the big machine, on account of its size and weight, for stoping in such narrow veins, even though in its own sphere it is already a success. The cause of failure in the use of the small drills had been due, in this mine at least, to the fact that the men who had attempted to work them were used to the big machines, where the strength of stroke and larger size of the hole overcame many of the difficulties encountered by the smaller ones. The latter naturally require more care and skill, but this care and skill is not so great but that any man of ordinary ability can master it.

The drill used by us weighed 170 pounds when mounted on a tripod. We found the latter to be much better than a bar, as it allows greater freedom of motion, something absolutely necessary in following a hole, and takes much less time in moving from one place and setting up in another. With the machine which we used the bolts are so arranged that a drill may be driven in any direction by a simple manipulation of the legs of the machine, which is easily acquired by practice.

The chief cause of trouble in machine drilling arises from the many "slips" and layers of alternately hard and soft rock which are found running in every conceivable direction in vein formations. A drill once started, for instance, will run freely till it strikes one of these slips, which it will, naturally, have a tendency to follow; or, again, if driven through soft seams it comes in contact with harder material, it will immediately begin to slip along the new surface.

This result, if allowed to continue, will cause the drill to "bind" against the bend in the hole, and will not only prevent the drill from entering the hole, but will hold it fast and prevent its withdrawal. This not only occasions much annoyance and loss of time, but frequently causes the total loss of a hole.

With a big machine, where the power is sufficiently great, the drill is driven ahead and pulled out regardless of the slips and bends, and this difficulty is more easily surmounted; but with the smaller ones constant watch must be kept, and the instant the drill starts to slip or bind the machine must be readjusted to follow the hole and the stroke shortened, as in starting. To do this it is seldom necessary to stop, for a perfect understanding of the drill and between the men working it allows the chuck tender to loosen the proper bolts while the machine is still in motion, and as soon as its position is changed enough to allow it to run smoothly it is fastened again. From personal experience I think it is not only unnecessary but unwise to attempt to drill holes too deep. This practice is usually the cause of much trouble and loss of time. From 3 to 6 feet is quite deep enough for such

work, generally speaking. This is all the more the case as the time required to move the machine from one place to another is very small indeed.

A tripod necessitates the use of a platform to work on, but as it is very easy to build one out of lagging, this is a matter of small consequence, especially as the planks may be used over and over again, and a platform once built saves time in the end, as it enables the workman to move about freely and rapidly and with less danger of accident.

So far, the economical side of the question has not been mentioned, but simply the practicability of the small machine. With regard to this new side of the question, and a most vital one, it is almost impossible to collect data of any general application because of the small amount of work that has been done with the small drills up to within the last few years.

However, I am informed by Capt. Thomas Mein, recently superintendent of the Robinson mine, in the South African gold fields, that in that great district the use of small machines on narrow veins is an established fact and is carried on with great success.

In the State of California I find that within the last six months some three plants of five small machines each have been put in, of which that of the North Star mine, at Grass Valley, is perhaps the best known.

My own experience in this line of work is about as follows:

With the "baby drill" two men, my partner and myself, were able to drill about 40 feet a day in hard quartz full of slips and seams. This work was done between the hours of 9 a. m. and 4.30 p. m. The rest of the shift was sufficient for us to do all our own timbering, to build our chutes and ladder ways, to shovel away our broken rock, and to keep the place in ship-shape order.

Circumstances favored me with a good opportunity to compare the machine with hand labor. During the holidays the compressor was shut down for a week or so, preventing the use of the machines, and for that period we worked in the same stope, using the hammer to drive our holes. This permitted an exceptionally fair and complete comparison. All the conditions were the same for both methods; the rock was the same throughout; the size of the vein and the nature of the working places were the same, and as we were situated away from the other workmen the quantity of rock broken daily by us could be and was accurately measured.

The results of the comparison were all in favor of the drill. We found that, as an average of the week's work, we were able to break down by hand labor just half the ground that we had broken before in the same time with the machine: or, in short, that two men are able, under similar circumstances, to do twice as much work with the machine as they can do by hand. There is also another incidental advantage attending the use of the machine, namely, that of improved ventilation.

One of the greatest difficulties of the directing engineer is to keep the men properly supplied with fresh air, particularly in making up-raises, and this difficulty is entirely eliminated when machine drills are used.

It must be evident, from these considerations, that the small machine drill, properly employed, is practical and economical, so far as labor is concerned.

There still remains to be considered the cost of drills, compressors, power, and pipe-line, etc. It is unnecessary to go into these questions in detail, because each case must be settled by itself, with a full knowledge of the situation, source of power, size of plant, etc.

But with an abundance of water power and the practical elimination of the effects of distance and position, made possible through electric transmission, the running expense for power is very slight, and the first cost of the plant is within the reach of any stable company, financially capable of either opening or running a mine. While a certain increase of initial expense for power and plant is necessitated, the reduction in the cost of labor is one-half greater than would be required to offset this outlay.

The reduction in the number of hands needed for breaking ore resulting from the use of power drills is one of the chief causes of the prejudice against the machines entertained by many working miners. But this prejudice is entirely unwarranted, for every cause that increases the output of the miner and decreases the expense of mining only tends to open new mines and enables old ones to increase their force, thus giving plenty of work to any supposed or possible surplus of miners.

On my return to the mine I hope to secure further and fuller data on this subject, in order to convince others of what I firmly believe myself, for I think it is only a question of time before we will have the "little machine" everywhere high up in the stopes, pounding its way into prominence and success.

POSTSCRIPT.

[By Prof. S. B. Christy, University of California.]

Through the kindness of Capt. Thomas Mein, I am able to add the following extract from a private letter received by him from the well-known South African engineer, Mr. L. T. Seymour. The letter is dated Johannesburg, March 15, 1894, and the extract reads as follows:

“Stoping.—Hand-stoping in medium ground, up to 4 feet wide, costs 5 to 6 shillings per ton with boys (Kaffirs). We are, at the Heriot and Gold Deep, stoping with machine drills at that price on 6-foot stopes. Each miner now runs 2 $\frac{3}{4}$ -inch Ingersoll-Sergeants or 3 $\frac{1}{4}$ -inch Little Giants. As a rule, a drill of this size costs (without dynamite) from £115 to £125 sterling a month to run, for all expenses, including depreciation and interest. The miners' wages come to from £58 to £63 out of this, or almost exactly half. Therefore, two or three drills, distributing the cohte wages over them, reduce this cost largely. I believe in three years' time we shall do practically all our stoping with small machines on the little stopes, and with large ones on everything over 4 feet. The 2 $\frac{3}{4}$ -inch Little Giant works very well.

“At some mines we make the man in a boys' stope run a small machine as well. On this basis, on a 4-foot 6-inch stope, each small machine stopes 279 tons per month, at a total cost, including dynamite, of 5s. 9d. per ton stoped, and with the large machines as high as 960 tons per white man per month, when he runs two drills.”

These figures tend to corroborate the position taken by Mr. Thane. Machine drills have been used in stoping at several mines in California for some time, notably at the North Star and the Utica. Their advantages over hand labor as to cost will depend almost entirely on the cost of power. Where the latter is cheap, there can be no question as to their advantage. The development of the water power of the State, which is now going on so rapidly, will be surely followed in the near future by the more extensive use of the machine drill in stoping.

ARIZONA.

By CHARLES C. RANDOLPH,

Phoenix, Ariz.

Arizona in 1900 produced gold to the value of \$4,250,000 and 4,250,000 ounces of silver. Its output of copper exceeded in value \$32,000,000. These figures, gathered from mine owners and operators and supervised by persons thoroughly familiar with the mining situation in the Territory, are conservative. They show a marked increase over the returns for 1899 and substantiate the assertions of experts that Arizona is destined ultimately to assume first place in the production of copper and to occupy a commanding position among the gold and silver producing States.

A remarkable feature of mining in Arizona is that the copper ores almost invariably are associated with the precious metals. Most of the copper mines in operation produce large amounts of gold and silver which are not placed to the credit of the Territory in the annual statistics, for the reason that the output is shipped away in the form of matte or black copper, and the precious metals it contains can not be separated outside of a refinery. Arizona does not possess a refinery, and it suffers severely as a result. It is the opinion of mining men, who are jealous of the Territory's reputation, that if Arizona had the smelting facilities of Colorado it would take rank immediately as the third largest producer of minerals in the United States. The disadvantages under which it labors doubtless will be overcome when the mining world becomes aware of the possibilities which lie in the mountains and desert regions of this sun-kissed land.

The year 1900 was marked by great activity in the old established mines, and more than the usual amount of prospecting and development work was done. The advantage possessed by Arizona in respect of climate can not be overestimated. Except in the highest mountain ranges, mining operations may be conducted every day in the year, and the drawbacks resulting from snow and cold in the higher altitudes would be a bagatelle to miners accustomed to the rigors of Alaska and other northern mineralized sections. The comparative mildness of the winters here preclude the necessity of heavy expenditures for buildings and fuel for the protection of the employees. The winter air is bracing, and in summer, owing to the lightness of the atmosphere, men work in the open without fear of sunstroke.

Although vast strides have been made in mining in Arizona in the last few years, the countless locations and strikes that are being recorded show that the field is practically limitless. Gold is found in all parts of the Territory. It occurs either as placer deposits or in veins in nearly every mountain range. Isolated hills in the desert have been found to contain inexhaustible deposits. The famous King of Arizona gold mine, which produces \$40,000 a month, was discovered by accident in a region popularly supposed to be barren of

everything except rocks and cactus. The general knowledge of the wide distribution of gold in Arizona lends zest to the life of the prospector, and his is a constantly growing class.

The banner gold-producing county in 1900 was Yavapai, of which Prescott is the chief town. The famous Congress mine, which has yielded more than \$6,000,000 since it was first opened, maintained its high rate of progress. The Congress group is in what is known as the Martinez district, 70 miles north of Phoenix, the Territorial capital. It is connected with the main line of the Santa Fe, Prescott and Phoenix Railroad by a well-equipped branch road. The town of Congress and the mines and reduction works are located at the mouth of a short canyon, broad enough at the bottom to give ample room for the necessary buildings for town and works. The outcrops of the veins are on the mountain sides, giving abundant fall for waste dumps and the proper arrangement of mills. The water supply comes from Martinez Creek, 1 mile away. It is raised 500 feet by a steam pump, to get over the ridge, and runs into the camp by gravity. Three hundred and fifty men are employed in the mines and surface works. The mill, mine, and all company buildings are lighted by electricity. By a system of switch-backs the company's road delivers freight directly at the mine. There is a well-established hospital, and the camp has direct telegraphic communication with the outside world.

Inasmuch as it has been charged that Arizona's mines "do not go down," I shall go into details concerning this wonderful property, employing for the purpose the interesting statement prepared by Mr. W. F. Staunton, the general superintendent of the Congress mine. Twenty-three claims are owned, and the greater part of the work has been done on only three—the Congress, the Niagara, and the Why Not—although all the others carry promising veins and will eventually be explored.

The country around the Congress is all granite and granitic gneiss. This rock is cut through by a series of approximately parallel dikes of greenstone trap, having a general easterly and westerly strike and a dip of about 20° to the north. The Congress vein is in one of these veins, or perhaps it may be said that the dike is the vein, for ore has been found in the dike in all possible positions from one granite wall to the other, but generally occupying a position near the foot wall and separated from it by a layer of vein selvage. The dike has a thickness of about 15 feet, measured at right angles to the walls, but this is uncertain, as we rarely see the hanging wall in the mine, the drifts hugging the foot wall and their height not being sufficient to expose the hanging.

These greenstone dikes are crossed by other more nearly vertical dikes having a northeasterly and southwesterly trend. The cross dikes are apparently a kind of quartz porphyry. Very little is known of them, as they do not appear to be ore bearing and have been but little exposed in the underground works. They do not seem to mark lines of faulting, as the greenstone dikes are not thrown at the intersection. They are apparently of more recent origin than the greenstone dikes, as they appear to cut the latter and occupy the space of intersection.

In addition to the Congress vein, upon which the greater part of the work has been done, there are several others of equal promise on the surface and holding out extremely well to the extent of the development work that has been done upon them. One of them crosses the

Congress at an acute angle, and another, known as the Niagara, is parallel to and in the foot wall of the Congress. The veins are entirely inclosed in the granite without the accompanying dike, which is such a marked feature of the Congress vein. The Niagara vein is being systematically opened by shafts 3,000 feet apart, both of which show up a large continuous vein of excellent grade ore down to a level of 500 feet, with every promise of continuance to great depth. There are many smaller veins carrying good ore which have not been explored to any extent.

The Congress ore is white quartz, carrying very pure iron pyrite generally disseminated through it in small particles, but at times in quite massive form. There is little if any gold in the quartz showing no pyrite, and hardly any free gold exists in the ore. The pyrite carries on an average about 8 ounces of gold to the ton. Other sulphides so commonly accompanying iron pyrites are notably absent, a little galena of very rare occurrence being the only one identified, and chemical analysis of the concentrates from the ore showing hardly a trace of copper, arsenic, antimony, or, indeed, of anything but iron, sulphur, and silica. The Niagara ore, on the contrary, shows considerable galena and some copper minerals besides the iron pyrite. This difference appears to be characteristic of the ores of this neighborhood when the veins are entirely in the granite, as distinguished from those which are accompanied by the greenstone dikes.

There are three principal shafts on the Congress, all sunk on the vein and conformably to its dip. No. 1 and No. 2 shafts are 600 feet apart and No. 2 and No. 3 1,000 feet apart. Nos. 2 and 3 are connected on the 1,700-foot level, and each have hoisting machinery capable of sinking to 3,000 feet, which depth No. 3 has already reached. Sinking is being done by means of air drills, and the dike and ore are found to be continuous and strong, the ore, in fact, being larger and better than average grade.

The system of mining followed is to block out the ground by main levels, driven dead, approximately 300 feet apart. Stopes are then started at the shaft and rise above these levels. As the tops of the stopes reach the height decided upon as the proper distance for another level—generally 75 feet—the level is carried in, practically being already formed by the stope, with the exception of a little cutting of the roof to make room for the timbers. The ground stoped out is filled with waste as soon as possible, as the roof soon becomes heavy and the temporary supports put in would crush without filling. By this method of stoping a large part of the waste broken is kept underground, serving the purpose of supporting the roof, saving hoisting, and causing the air to circulate upward along the working breasts of the stopes.

The reduction works consist of a 40-stamp mill and a cyanide plant for treating the tailings. The milling process is as follows: The ore from the mine is dumped on grizzlies, the oversize passing through two 9 by 15-inch Blake crushers, and thence with the fines to storage bins of about 1,000 tons capacity. Tullock feeders draw their supply from these bins for the forty stamps. The stamps weigh 850 pounds each, and drop 6 inches 90 times per minute. Steel wire screens are used. The pulp is fed direct to 20 Frue vanners equally divided between them. The resulting concentrates are dumped upon a sand filter to drain, and while still moist are loaded in bulk, without sacking, into cars for shipment to the smelter. The tailings pass to a sand pump, which elevates them to settling tanks and where the sur-

plus water is removed and pumped back to be used over again, while the tailings are run in cars to the dump. An entirely new 40-stamp mill with concentrators will be erected early in 1901.

Fine crushing and concentration at one operation on such material as the Congress ore is not a clean operation, but is probably the best process available considering the small supply of water. The concentration percentage is in the neighborhood of 80 on \$16 original ore, and the greater part of the loss is in the very fine slimes. It is quite probable that closer work could be done by hydraulic classifying previous to concentration, but the changes in the mill necessary to introduce this in a proper way would be quite extensive, as the necessary fall between the batteries and vanners is at present lacking.

The rate of crushing is 100 tons per day, or two and one-half tons per stamp.

The tailings from the concentrating mills are reworked by the cyanide process at the rate of 110 tons per day. The plant comprises a large Brown mechanical roaster, 7 leaching tanks, each 26 feet in diameter by $4\frac{1}{2}$ feet deep; 4 solution tanks, 15 feet in diameter by 10 feet deep, together with the necessary bins, boilers, engines, pumps, piping, zinc, boxes, etc., the whole being inclosed in substantial corrugated-iron buildings, covering an area of over 12,000 square feet. The tailings as they come from the concentrating mill are bedded and partially dried by plowing and exposure to the sun.

They are then dumped into a Stedman pulverizer, going thence by elevator to a storage bin, from which they run by gravity to a self-feeder of the roasting furnace. The furnace is fired with California crude oil, using 3 burners. Emerging from the roasting furnace thoroughly desulphurized and oxidized, the tailings are automatically carried along on a sheet-iron cooling hearth, passing under a spray of water to lay the dust and assist in cooling; and thence go the leaching tanks, where the gold is dissolved and collected on zinc shavings in the usual way. This plant is now being enlarged by the addition of 3 200-ton tanks to handle the increased output when the new mill is in operation.

As already stated the output of this great mine has passed the \$6,000,000 mark. Notwithstanding the fact that the reduction works have been continuously operated at full capacity, the development of the mine has been kept so far in advance of stoping that there is now more ore in sight than at any time since the company began operations. There are many miles of underground passages, and the deepening process goes steadily forward.

Yavapai County boasts of another magnificent gold-bearing property, the Crowned King mine. It had been producing steadily for ten years until a short time ago, when it was closed through litigation. It is opened by several tunnels on the vein, one beneath the other, connected by winzes and shafts. The ore body is regular and continuous and of remarkably even value, although occasionally very rich strikes are made. In 1899 considerable ore was encountered that assayed as high as \$50,000 a ton. Few mines are so well situated for economical working. The ores are reduced by a stamp mill and concentrators. A large percentage of the values is saved on the plates, the concentrates being shipped away to smelters. During the operation of the mine the owners declined to give any information concerning the output, but it is certain that several million dollars have been produced.

The McCabe mine, situated near Prescott, has been opened to a

depth of 700 feet and is producing gold regularly. Its owners do not respond to inquiries concerning the value of the output. Near it is the Little Jessie, a great gold producer in its day, but closed down in 1900 by reason of litigation.

Below the site of the Walnut Grove dam on the Hassayampa River, in Yavapai County, is the Crown Point mine, which is down about 500 feet in high-grade ore. While this report is being written, the report comes that an immense ledge of good milling ore has been opened.

There are hundreds of small but promising gold properties in Yavapai, which are shipping ore to the smelters in Colorado and Texas. They are destined to play an important part in the growth of Arizona as a producer of the precious metals. Around the head of Lynx Creek, for instance, a large tonnage is being treated and shipped. This region is highly mineralized, and by another year the list of paying mines there will be large.

What is known as the Weaver district is another rich section, abounding in small properties. All of the veins run high in gold from the grass roots. The gold-placer deposits of this district are widely known by reason of the abundance of gold they have produced. Although they have been worked many years they still yield several thousand dollars' worth of the yellow metal every month to the few men who carry on operations there. These deposits lie at the foot of "Rich Hill," near Stanton. In the early days a party of prospectors found a wonderfully rich deposit of gold on the top of this hill. The gold is coarse and heavy. Nuggets, ranging from \$10 to \$450 apiece, have been taken out. Three lumps of gold secured by one miner netted him over \$1,000.

The Octave mine in Weaver district, was, in 1900, equipped with a 40-stamp mill. This is a promising property. It is operated by men who have made money in the Pennsylvania oil fields, and they intend to develop it thoroughly.

The Commonwealth mine at Pearce, Cochise County, is one of the noted gold mines of the Territory. Its product in 1900 was estimated at about \$40,000 a month, and there was also a heavy output of silver.

The mine was shut down for sometime on account of a disastrous fire. A new mill, with a capacity of 100 tons a day has been installed, together with other improved machinery, and the mine has fairly started on a new career, which its owners believe will be marked by exceedingly rich returns.

The King of Arizona mine is located in Yuma County. It is in the desert, 40 miles distant from the Southern Pacific Railroad. It was discovered a few years ago by a prospector named Eichelberger, who had no idea that the specimens he exhibited in Yuma and elsewhere would bring a fortune to himself and lead to the establishment of one of the richest gold mines in the Southwest. The chief difficulty that confronted the capitalists who undertook the development of the property, was the entire absence of water in the neighborhood of the "strikes."

For three years their efforts were devoted to finding water, the expense of the undertaking being enough to deter the average group of men. Finally it was found in abundance 1,000 feet below the surface at a point 4 miles distant from the chief location. Fifteen miles away another heavy body of water was struck. Pipe lines were laid in 1900, pumps erected, and a roller and cyanide outfit was installed. The capacity of the plant is 125 tons a day, and the average return is

\$10 a ton. The chief owner says that the net earnings in 1901 will exceed \$20,000 a month.

The great Fortuna mine, which has produced millions in gold, also lies in Yuma County. It is in the Gila range, and its outcrop lay for many years near a beaten road without anybody taking the trouble to investigate it. The following facts relating to the yield of the Fortuna make interesting reading. The rocks at the outcrop are mostly of homogeneous granite, of gray color and weathered out at the surfaces, which, however, are much pitted, as if by decomposition of some soft substance. But beyond these low-lying hills there are big outcrops of rock which indicate stratified formations. The bulk of the range is composed of mica slates and hornblendic slates, with interpolations of quartzite beds. The workings which have been carried on have developed a condition of things which could not be foretold from an inspection of the outcrop. The vein or lode appears to be a chimney, not a continuous ore body nor a continuous vein with an ore body or chute upon it. The vein is remarkable because of this limited outcrop, its continuity in depth, its continued and satisfactory richness, and the promise it gives of enrichment by further veins dipping into it on the foot-wall sides.

The ore of the Fortuna paid from the very beginning of operations. Up to 1900 the product averaged about 80 tons a day. There is a 20-stamp mill. Compressed air is employed to work the drills. The average returns have been about \$48,000 in gold a month. As much as \$90,000 worth of gold has been extracted in a single month.

At Mammoth, 30 miles north of Tucson, there are three companies at work and the aggregate output of gold is \$50,000 a month. The St. Louis Gold Recovery Company and the Mammoth Cyanide Company are working tailings from the Mammoth-Collins gold mine, and this famous mine is producing enough tailings each year to keep both companies in constant activity. At the Mammoth 40 stamps are being added to the 40 which have been pounding out gold for many years. The camp is one of the most substantial in the Territory. The Mammoth mill handles 300 tons of ore a day. There are three cyanide plants capable of handling 300 tons each. A stage line is operated between the camp and Tucson, and all the freighting is carried on from Tucson.

In referring to the gold producers of Arizona, mention should be made of the well-known Vulture mine, which has produced millions for its different owners. The late H. A. W. Tabor, of Denver, owned this property at one time and realized a fortune from it. It was never handled in a scientific manner, the object of those working it being to extract the values in the quickest possible way. In the early days the warlike Apaches made its operation a matter of great personal danger to the owners and their employees. Far from civilization and supply points, the men were frequently paid with gold chopped from the ingots produced. No attempt was made to save the lesser values, indeed there was no process available for such a course. Three years ago a Denver man cleaned up about \$75,000 from a portion of the tailings. The remaining tailings are very rich. The property passed under the control of Chicago parties in 1898, and recently a New York syndicate bought it, and is preparing to work it upon its merits. There is little doubt that in a year or two the Vulture will again become known as a rich producer.

The Greaterville placers in Pima County, not far from Tucson, have yielded much gold in the last fifteen years, it being estimated that

several millions have been taken out since their discovery. The operations in 1900 were carried on by Mexicans principally, who are satisfied with small returns from the primitive methods employed. A dry washer has been invented by a southern Arizona man, who is satisfied that it will recover a large portion of the gold in these placers.

While the aggregate of big gold mines in Arizona is small, the number of modest properties is increasing at a tremendous rate. I have received advices from many small operators showing individual returns ranging from \$1,000 to \$5,000 for 1900. There are dozens of small stamp mills pounding away on gold in the hills of the territory, and capital is becoming largely interested. In Mohave County particularly there are many gold-mining enterprises of which the public hears but little. The gold placers of the Chemeheuris mountains are worked by the dry washing methods. Banks of auriferous gravel are found along the Colorado River north of the White Hills. The White Hill mines, in Mohave County, are coming to the front, and there are extensive mining operations at Chloride and Todd's Basin and Cubab, in the same county. Pima and Pinal counties have several districts which promise well. In a few years, if the present rate of progress is maintained, Arizona's statistics of gold production will occupy a large place in the public eye.

SILVER.

In spite of the fact that but few mines in Arizona are being worked distinctly for silver, the output for 1900 showed a large increase, according to the returns of mine owners, the silver coming as a by-product with copper, and also from mines producing gold. One superintendent of a gold mine writes me that his mine turned out about 25,000 ounces of silver in 1900. One of the big copper mines produced over 500,000 ounces of silver. The Chloride district, in Mohave County, has come into prominence in the last two years as a great producer of the white metal. There are many silver mines there that show a constantly increasing product. In the Castle Dome district, in Yuma County, the veins carry about 30 ounces of silver to the ton. In the Globe district there is a distinct silver-bearing region, which in the old days proved to be very remunerative. The silver is found in limestone pockets. One such pocket discovered in the Old Mexican mine netted the owners \$168,000. A silver nugget found near Globe some time ago weighed 30 pounds and was 0.900 fine.

Active work was carried on in 1900 on the San Xavier silver mines in Pima County. Vast bodies of low-grade ore have been opened. A concentrating plant is to be erected. In the Washington district, in the same county, is the World's Fair silver mine, owned by Frank Powers. It is one of the richest silver mines in the world. Powers has been offered a half million dollars for the property, but he prefers to retain it and work it in a desultory way, taking out enough each year to maintain his family in comfortable circumstances. He closes the mine against all mining experts and holds it as his bank.

The great mines at Tombstone, which have produced more than \$25,000,000 in silver and gold and lead, 5,000,000 ounces of silver having been mined in 1881, have been idle for years, although as rich as ever. The low price of silver, coupled with the drawback caused by the great influx of water in the lower levels, combined to put an end

to operations there. The connection of the deposit, or veins, under ground is such that one claim can not be drained without draining the others. One company erected a costly pumping plant and undertook to clear its mine, but soon found that it was removing the water from the adjacent properties without cost to their owners. The latter declined to share the expense of pumping. While the controversy was on, a fire swept away the pumping plant and much costly machinery. That put a stop to all operations of importance at Tombstone.

There has been considerable chloriding at the camp in the last few years, but not on account of the big companies. At this time of writing the companies have entered into an agreement to reopen and operate their properties, and it is expected that the coming year will see a grand revival of the celebrated camp. The average product of the mines at depth is 60 per cent silver and 40 per cent gold.

Had silver held its former price of \$1 or more per ounce, Arizona to-day would lead the country in the production of the white metal. Her mountains are ribbed with silver, and transportation facilities are immeasurably better than in the days when silver was king.

COPPER.

While this report is supposed to deal particularly with the precious metals, it would be incomplete without a statement concerning the copper-mining industry, which is paramount in Arizona. Michigan and Montana alone of the mining States lead Arizona as copper producers, and as the copper area in those States is circumscribed, while in Arizona the metal is widely diffused, experts say the day is not far distant when the State that is to be will lead the world in the copper statistics. Copper is found in every part of Arizona where prospectors find their way. There are already five well-known points of production separated by great distances, in some instances the camps being 300 miles apart. The best known and best developed properties are at Jerome, in north central Arizona; at Bisbee, in the extreme southeast; at Clifton, on the extreme eastern border; at Morenci, which is near Clifton, and at Globe, in the east central portion of the Territory. Then there are producing mines without number in all the hills. Copper is known to exist on the Bill Williams fork of the Colorado River, in Yavapai County; in the region of Wickenburg, Maricopa County, and large deposits are being opened in the region of the Grand Canyon of the Colorado. An extraordinary deposit is being rapidly developed in the Ajo district, in Maricopa County. At Washington camp and at Helvetia, in southern Arizona, the operations have assumed an important stage. In the Santa Rita range is located the Rosemont camp, which did not accomplish much in 1900. The Rosemont smelter was blown in in March, 1901, after being idle eight months. The ores which are smelted come from the Mohawk claims principally, which are located a mile from Helvetia, on the west side of the range. The ore is packed over the crest of the mountains on burros. The Rosemont Company also owns some good claims on the east slope of the Santa Ritas, near the smelter, and enough ore is available to keep the smelter running a long time.

The high price of copper last year stimulated prospecting and the investment of capital in copper properties, and the outlook is for increased activity in this direction.

The United Verde mine at Jerome, owned by United States Senator

W. A. Clark, of Montana, heads the list of Arizona copper bonanza possessions. It was estimated in 1899, in the annual report of the governor of Arizona, that the monthly product of copper bullion of the United Verde was 3,000,000 pounds. I am positive that the output in 1900 exceeded this amount. The bullion contains considerable gold and silver. It has been estimated that each ton of copper ore carries about \$3 in gold. The gold produced at Jerome last year would be regarded as a very satisfactory return by the owners of some of the best known distinctively gold mines.

The ore bodies of the United Verde are of great extent and value and will not be exhausted fifty years hence. The principal shaft is about 800 feet deep and there are extensive underground workings. Over 1,000 men are employed in and about the mine, and the town of Jerome, which depends upon the United Verde for its existence, is growing at a rapid rate. The adjacent region is rich in mineral, and mining operations are very active there.

The Copper Queen Company, of Bisbee, is another great producer of copper. It ships 70 tons of copper matte daily and also a large amount of black copper in ingots. Three blast furnaces are operated and about 1,000 men are employed. The town of Bisbee is assuming much importance. It is connected with the Southern Pacific Railroad by a well-equipped branch road. Fully a million and a half dollars are invested in the Copper Queen plant. The value of the extensive property can hardly be estimated.

In the Clifton copper district are found the extensive plants of the Arizona Copper Company at Clifton and the Detroit Copper Company at Morenci. Both are large producers, employing several thousand men in their various branches. Each camp is a model of its class.

The Globe copper district produces millions of pounds of copper annually. The completion of a railway connecting the district with the Southern Pacific Railroad had a stimulating effect upon the production in 1900. The cost of producing copper in this district has sensibly decreased in the last two years. The many copper mines in the region are regarded as extremely valuable.

The Helvetia camp, in Pima County, made a great record in 1900. As many as 800 men were employed, and the 125-ton smelter was run to its full capacity. The greatest mineral strikes in the history of the camp were made last year, ore bodies being encountered which will supply the smelter with ore for years to come. In one shaft a body of high-grade sulphide ore was discovered which has a width of 40 feet.

Native copper was encountered in another shaft. The smelter burned early in 1901. At this time of writing a new smelter is nearly ready to be blown in. The copper production in 1900 averaged \$40,000 a month. The consensus of opinion among mining men of the region is that Helvetia possesses one of the richest storehouses of wealth ever discovered in southern Arizona.

Columns might be written about the wealth of Arizona in copper. From this time forward the statistics will tell a story which will astonish the world. In point of lead production Arizona also will be heard from favorably. Santa Cruz County is making a record in the production of this metal. In Pinal County lead ores carrying silver occur in several places. In the Mammoth mine lead ores are frequently encountered. The Vekol mine, in Pima County, is famous for its lead. Galena, the sulphide of lead, is abundantly distributed in the Territory.

SOURCE OF PRODUCT.

	Fine ounces.
Gold:	
From quartz	196,494
From placer	9,100
Total	205,594
Silver:	
From quartz	2,571,977
From lead ores	225,732
From copper ores	1,452,291
Total	4,250,000

CALIFORNIA.

By CHARLES G. YALE.

The tables appended to this chapter show the production of gold and silver in the State of California for the calendar year 1900, the tables being the results obtained from returns by producers to the mint of the United States at San Francisco. These returns show that the yield of the State in precious metals in 1900 was—

Gold	\$15,863,355
Silver	1,510,344
Total	17,373,699

The silver throughout this chapter is given in figures of coining value so as to conform to the general tables of production prepared by the Director of the Mint. Moreover, a greater effort has been made to obtain the proportion of silver in the gold shipments than has been usual, and this, together with the use of the coining value instead of commercial value, will account in a measure for the figures which show a material increase in silver product.

In comparing the totals of gold and silver returns for 1900 with those obtained from the same sources in 1899 it will be seen that a total increase of \$1,533,656 has taken place, of which \$527,324 was in gold and \$1,006,332 was in silver. This marked increase in silver is explained in part in the preceding paragraph, though there has been a real as well as apparent increase in the output of this metal.

The term “undistributed” in the recapitulation table showing yield of the State by counties, is intended to cover the yield of ore, sulphurets, etc., purchased by or shipped to the smelting companies and from which no direct returns from original producers were received at the mint. It covers the gold obtained from smelting lead and copper ores, exceptionally rich quartz, sulphurets, etc. The separate amounts making up this “undistributed” aggregate it is impossible to apportion to the respective counties. It is found impracticable to ascertain the proportion of gold from the different classes of ore worked, or the source by counties, as no track has been kept of it in these respects. In some parts of the State miners have shipped ores taken out on tribute or on leases. In others, miners owning their own claims, but no reduction works, have been the shippers. And again, the smelting companies have purchased ores and sulphurets and have not endeavored to ascertain the source by county. The term “undistributed” covers the yield in such cases.

Of the sum of \$17,373,699 (total gold and silver), \$14,058,187 was derived from quartz-mining operations, \$1,367,016 from hydraulic mines, \$1,018,246 from drift mines, and \$930,250 from surface placer operations. The placers include ordinary surface diggings worked by rocker, sluice, or tom, river-bed mines, bars, ground-sluicing operations, dredgers, etc. From dredging operations included in the placer

total is the sum of \$200,929. This was obtained by machine dredges, several of which are now in operation in the State and more are being built. Some which were working in 1899 did nothing in 1900, while other new ones only commenced productive operations late in the year under consideration. Some large tracts of gravel land around Oroville have been recently purchased and new dredgers are to be built to work it. Other dredgers are to be placed on the Klamath River or its tributaries, where some dredging work has already been done.

From copper-mining operations in Shasta, Calaveras, and San Bernardino counties they obtained \$382,264 in gold and \$645,219 in silver, all of which is included in the total from quartz. The largest operations of this character are in Shasta County. Ores are purchased from numerous quartz mines for use in mixing with the copper ores of the Mountain Copper Company, and it is from these ores that this gold and silver is procured. A great number of miners are now enabled to dispose of their ores to the smelters, and these mines are thus made productive without the necessity of special reduction works.

In the returns received at the mint at San Francisco from quartz mines, \$67,660 in gold and \$70,738 in silver are shown to have been derived from lead ores. Doubtless there was more of the precious metals from this source as well as from copper and other ores, since more or less ore was purchased by the smelters, the returns from which are given under the term "undistributed" in the table of production by counties.

For the fourth successive year California experienced a "dry season" in 1900, the rainfall having been much less than the normal amount. As a result there was a very short season for hydraulic mining and a scarcity of water in the ditches which deliver water to the quartz mills for power. In the fall in several of the mining counties many quartz mills had to close operations entirely for a time or "hang up" a portion of their stamps. This caused the temporary discharge of many miners and reduced the amount of ore worked.

Many of the larger quartz mines of the State, where they use water for power, have now provided themselves with steam plants as well, which may be used when the water supply is short. The increase in electric-power plants has brought a means of relief and furnished cheaper power. Along the mother lode and in some other localities crude California petroleum is now being used for fuel instead of wood, which will decrease cost of milling quite materially. Several of the larger mines have contracts for oil fuel, which will make a decided difference in former cost. The developments in the oil fields of the State within the past year are thus seen to exercise a beneficial influence on the gold-mining industry. The cost of transportation of coal from the railroad has prevented the use of that fuel, and wood had to be depended on. As this has become scarcer and higher the advent of the oil fuel in the quartz-mining regions of the State is a matter of great importance.

The reopening of old quartz mines continues in many parts of California. These mines were abandoned years ago when the prevalent conditions made the cost too high to work ores of low grade. With the improvements in processes and machinery such mines have become valuable, provided sufficient capital is invested to properly develop and equip them. In fact, along the mother lode the best paying mines of to-day, and the deepest, are those which had lain idle for many years, but were intelligently reopened and properly equipped with modern machinery. Capitalists seem to prefer to reopen a mine

which had made a record for bullion output in its early history rather than to take the chances on opening and developing an entirely new prospect.

In the year 1900 there were 31 counties of California which made a production of gold, as against 30 in 1899, and there were 26 which produced some silver, as compared with 20 in the previous year.

The counties which produced in 1900 over \$1,000,000 each, in their order of rank are as follows:

Nevada	\$1,878,877
Calaveras	1,729,888
Tuolumne	1,659,258
Amador	1,388,703
Shasta	1,369,107

The order in rank of those counties producing over half a million dollars in gold alone is as follows: Nevada, Calaveras, Tuolumne, Amador, Placer, Siskiyou, Kern, Shasta, Mono, Sierra, and Trinity.

The order in rank, considering silver only, of the counties producing over \$50,000 is as follows:

Shasta	\$635,640
San Bernardino	172,759
Kern	147,736
Inyo	113,493
Calaveras	80,602
Mono	75,921
Nevada	66,841
Tuolumne	62,367

The order in rank of the counties producing over half a million dollars in combined yield of gold and silver is as follows: Nevada, Calaveras, Tuolumne, Amador, Shasta, Placer, Siskiyou, Kern, Mono, Sierra, and Trinity.

These figures, as stated, relate only to rank in the production of gold and silver. When the values of some forty other mineral substances produced in California are considered, the rank is then very different. Shasta County, in that case, heading the list, owing to its large copper output, and some of the other gold-yielding counties with large products also of petroleum, borax, quicksilver, etc., outranking those which only have gold and silver mines.

In Amador County, while an increase in silver is shown over the previous year's record, the decrease in gold output is quite material and makes a total decrease in the yield of the county of \$163,067. Some of the larger mines made smaller returns than in 1899, which is the cause of this showing. This is one of the "mother lode" counties, where very deep mining is being carried on and where the existence of good ore bodies at great depth have been proven. Several of the most productive mines at the present time are those which were abandoned twenty or thirty years ago at a depth of 400 or 500 feet, when it was thought there was nothing worth seeking for farther down. On the reopening of these mines, however, systematic deep sinking was carried on, since which time they have been much more profitable than during their early career. In one of these mines where good ore bodies have been found at a depth of 2,300 feet, an entirely new shaft is being sunk some distance from the old one, which has been equipped so as to be sunk to 6,000 feet. In other mines very heavy machinery has been put in, capable of handling ore from great depths. The producing mines in the county are quartz properties and the principal ones are the Keystone Consolidated of Amador City; the Argonaut; Kennedy; Oneida and Zeila, at Jackson, and Central Eureka; Lin-

coln; Wildman; Mahoney; South Eureka and Western (Baliol), at Sutter Creek.

Butte County shows an increase of \$6,816 in its total product over previous year. This is essentially a gravel mining county, though there are several quartz mines, including one important one—the Gold Bank, at Forbestown. It is in this county that the largest dredging operations in the State are being carried on. Several gold dredgers are at work and more are being built. The dredging operations are by no means confined to the river beds, but are carried on at some distance from any streams, in the middle of old bearing orchards. The fruit lands have been bought up by the dredging companies, which sink a hole at any suitable point, place the hull or boat part of the dredge therein, put in the requisite machinery, and begin digging. The surface water flowing into the excavation floats the dredge. The buckets dig ahead and the tailings and rocks are thrown behind, partly filling up the space excavated. Thus the dredger carries its float hole with it, so to speak. The trees are sacrificed, of course, the auriferous gravel underneath the orchards being more valuable than the trees and their product. Within the past year many hundreds of acres of such lands have been purchased for mining purposes. There are many Chinese in this county, working on their own account or in a small way. The largest producers in the county are the dredgers and gravel mines near Oroville and the quartz mine at Forbestown.

Calaveras County shows the largest increase in gold product of any county in California, which is mainly due to the operations of the Utica, Lightner, and Gwin mines. The principal producing mines in the county are quartz, and are the Angels, Lightner, and Utica mining companies, at Angels; the Gwin Mine Development Company, at Gwinmine; the Royal Consolidated, at Hudson, and the Sheep Ranch mine, at Sheepranch.

At Robinsons Ferry some extensive operations are going on at the Melones Consolidated, but they have not yet been brought to a producing stage. The Gwin is one of the very old mines of the State, which has been reopened by a new shaft and equipped with an extensive plant.

At this mine deep gold mining on the mother lode has again been proved very successful. In this county 1,512 miners are employed, an increase of one-third the number employed in the previous year, and this has been followed by an increase of one-third in precious-metal yield for the year. Calaveras was No. 4 on the list of gold-producing counties in 1899, but in 1900 it takes second place, being preceded by Nevada and followed by Tuolumne. The total increase of yield over previous year is shown to be \$454,511.

Del Norte, which is entirely a placer-mining county, with some beach mines, shows a decrease of less than a thousand dollars from the previous year's output.

Eldorado County lessened its product of the year by \$19,241. One of the large quartz mines of the county has been closed down entirely as unprofitable. While this is a noted placer-mining region and the county in which gold was discovered in California, the principal single producers are now all quartz mines.

Fresno is not a very important county from the gold-mining point of view, though it shows an increase of product for the year of \$4,683. In this county some very extensive and important developments in

petroleum have taken place of late, and there are now many producing wells.

In Humboldt County mining is confined to hydraulic and ocean beach-sand operations. The principal hydraulic mines are at Orleans, and beach mining is carried on at Dows Prairie, Eureka, Orick, and a few intermediate places along the edge of the Pacific Ocean. The county shows an increase of \$40,668 over its record of the previous year.

Inyo County shows a decided increase of product both in gold and silver. The mines around Ballarat have come to the front with good yields, and there are more of them at work. The principal producers are quartz, and they are the Radcliff, at Ballarat; Lane, at Darwin; St. John, at Modoc, and Reward mine, at Reward.

While the gold product of Kern County is less by \$58,162 than in the previous year, its increase in silver product amounts to enough to make the total increase in precious-metal product of the county come to \$82,764. There are fewer men employed in the mines than in 1899, owing to the closing of some of the mines around Randsburg. The principal quartz mines in the county are the Dead Tree, at Amalie; Ophir group, at Havilah; Karma, at Mohave; Fairview and Leader, at Rosamond, and the Butte, Napoleon Consolidated, and Yellow Aster, at Randsburg.

The last-named mine is one of the largest producing gold mines in the State. The company owning it recently completed a \$90,000 water system and a new hundred-stamp mill. The mine employs about 125 men, and, aside from its productiveness, is important in that it has proven the existence of paying ore at good depth in the Randsburg district.

Lassen County shows a decrease in product of \$8,415, due to lessened product of some of the mines at Hayden Hill. Los Angeles County shows a decrease of \$7,624, the mines at Acton and Newhall not having produced as much as usual in 1900. In Madera County the total product exceeds by \$33,917 that of the previous year. The principal production came from the Waterloo at Coarse Gold, the Gambetta at Grub Gulch, and the Mud Springs mine at O'Neals.

The most marked decrease in output for the year of any county is that shown by Mariposa, the product of which for the year is \$393,520 less than in 1899. The closing down and abandonment of the Mount Gaines and lessened product of other mines near Hornitus accounts for this in some measure. The Whitlock and Alabama, at Whitlock, now being worked by leasers, also shows a lessened yield. The largest falling off is, however, due to the fact that the Merced Gold Mining Company, which was the largest producer in 1899, did development work only in 1900 and did not run its mill. This was the largest producer in the county and still employs 80 men in the development work. In fact, the amount in which the county is lacking for the last year is about the aggregate amount produced in the previous year by the three large mines mentioned.

There is very little difference in the yield of the two years in Mono County. There is a small decrease in gold and increase in silver. The principal camp is Bodie, at which place is the most important mine in the county, the Standard Consolidated. Another mine making a good production is the Crystal Lake Company, at Lundy. There are several cyanide plants at Bodie which are operated on tailings in

a profitable manner. The county pays the highest rate of miners' wages in the State, the average being \$4 per day.

Nevada County, while showing for the year a marked decrease in its gold product, is still the leading gold-producing county in the State, a record which it has maintained for many years. Very few new mines were added to the producing list last year, while some of the larger producers show a lessened yield. The hydraulic mines of this county, which formerly made large outputs, are unable, under the present laws requiring impounding dams for their tailings, to work as much gravel as when there were no restrictions, and their yield is thus necessarily limited. Some of them are now worked by hydraulic and drifting process. In the latter only the lower stratum of the gravel deposit is worked, while by hydraulicking the whole bank can be worked. Some of the most important and best equipped quartz properties in the State are in this county, mainly at Grass Valley and Nevada City. In addition to holding first rank as a gold producer, this county has the distinction of giving employment to more miners than any county in the State, the number for 1900 being 1,989, a few more than in the previous year.

Orange County, which was not among the producers in 1899, made a small output from the Lucas Canyon placers in 1900.

Placer County, which comes No. 6 in rank among the counties of the State, shows somewhat of a decrease for the past year. This is the most important among the drift mining counties of the State, the Forest Hill Divide being the center of this branch of the gold-mining industry. The quartz mines of the county did not make as good a showing as in the previous year, which accounts for the lessened product in some degree, though the shortness of the water supply for the gravel mines had its influence also. This is one of the counties giving employment to over 1,000 men, though in this respect its rank is No. 6.

Plumas County shows a slight decrease from its product of the previous year. In this county are numerous small hydraulic mines and some few important quartz properties. The largest individual producer is a quartz mine, and the second is a hydraulic mine, operated by Chinese. However, there is no mine in the county which reached a yield exceeding the \$100,000 mark.

The mines at Perris and Banning, in Riverside County, are not as productive as formerly, which accounts for the slightly lessened product of this county. The Iron Chief, at Walters, a new property, is now the most productive mine in the county, and in a measure makes up for the deficit occurring at the camp at Perris.

Sacramento is essentially a gravel mining region, most of the claims being surface placers. There is one gold dredger at work near Folsom. The most productive mine in the county is a drift mine—the Blue Ravine—near Folsom. There are many Chinese operating near Folsom and some at Michigan Bar and Natoma.

San Bernardino, which is the second in rank in silver-producing counties of the State, shows for the year an increase of \$83,350 gold and \$47,156 silver, a total of \$130,506. The number of men at work has also increased from 389 in 1899 to 546 in 1900. The old silver mines at Calico are now only mined in a small way by tributers. The new properties at Ludlow and in the Slate Range greatly helps the county out in its product. The "dry-washing" placers near Bar-

stow, discovered in 1900, were very productive and profitable; some of the older mines, however, at Daggett and Vanderbilt, did not do so well as previously.

San Diego County shows an increase of \$22,097 in its total output for the year. The largest producer in this county is the Free Gold or Golden Cross mine at Hedges. A new producer of moment is the American Girl, at Ogilby; and the Oro Fino, at Escondido, makes a material increase in yield. The working of tailings by the Western Extension Company, at Pichacho, has been quite successful. There is little new to note of in the neighboring camps of Julian and Banner, where there are numerous mines, only one, however, yielding over \$15,000 for the year.

Shasta County holds first rank among the counties of the State as a producer of silver, and is No. 5 in both gold production and total. In number of men employed it ranks third. Were the copper product considered, this county would hold first rank among all the counties of the State as a mineral producer and lead them all by two or three millions of dollars. The operations of the Mountain Copper Company, at Fielding and Keswick, are the most extensive in the State.

It is due to the smelting operations at Keswick that so large an output of silver occurs. The company purchases large quantities of gold and silver ore, used as flux in smelting operations, with the result that, in addition to the copper, a great deal of gold and silver is obtained. The operations of this large company have had the result of stimulating the mining industry in this and adjoining counties, since the miners now have a ready market for their ores and do not have to construct individual reduction works. Their success has, moreover, led to other large investments in adjacent copper properties, and new smelters have been erected, while others are contemplated. Next to the Mountain Copper Company, the Midas Gold Mining Company is making the largest output.

Sierra County shows a marked improvement in its gold product for the year, though there is only one very large producing mine in the county. There are, however, numerous mines being worked in various camps. While mainly a gravel mining county, the three mines making the largest individual outputs are quartz, viz, the Cræsus, near Alleghany; the Gold Bluff, at Downieville, and the Sierra Butte, at Sierra City. The Cræsus is the most important mine in the county. The greatest number of mines in one locality are at Downieville. Sierra ranks No. 10 among the gold and silver yielding counties of California.

Siskiyou County shows a slight falling off in its yield as compared with the previous year, and stands No. 7 in rank of bullion production, while it is No. 2 in number of men employed. In this county there are 1,542 men employed—a few less than in the preceding year. This is largely a hydraulic-mining county—that is, most of the mines are of that class. However, the first eight mines in order of amount of yield for the year are quartz properties, and one of them alone produced one-fifth of the entire yield of the county. There are very large tracts of gravel in Siskiyou which are yet unworked, since, while water is more abundant than in the central counties of California, there are no large reservoirs and ditch systems from which water may be bought by men working on a small scale. The result is each mine must provide its own water supply, and many persons

have not the funds to bring in as much water as they could use. The quartz interests of Siskiyou County have greatly increased in importance in the past few years, as is shown by what is stated above. There are many Chinese working for themselves in this county and numbers are employed by the whites to work in gravel claims.

The largest single producer in the county is near Hornbrook and, as stated, is a quartz mine. The largest hydraulic mine, in point of yield, is at Sawyers Bar.

Stanislaus County shows a double yield for the year 1900, which is mainly due to drift-mining operations near Knights Ferry. The few mines in this county are all drift, hydraulic, or surface placers, no quartz being worked to a productive stage.

There is a very slight difference in the yield of Trinity County in the past two years, though the returns show fewer men employed than in 1899. This is a gravel-mining county, but there are several large producing quartz mines. The principal mines are the Brown Bear, at Deadwood; Chloride-Bailey and Globe, at Dedrick; Yellow Rose of Texas, at Abrams; Blue Jay and Golden Jubilee, at Carville. The principal gravel mines, mainly hydraulic, are the La Grange, at Weaverville; Compagnie Francaise, at Junction City; Indian Creek, at Douglas City; Trinity Gold Mining Syndicate, at Abrams; the Hurtevant claims, at Junction City; and the Sykes Company, at Trinity Center. Near Lowden Ranch the Poker Bar Mining Company are running a gold dredger successfully. There are numerous Chinese in this county working for themselves or for the whites. Some important discoveries of extensive gravel beds have been recently made on the tops of the mountains above the La Grange properties, and these are now thought to have been the source of the gold found in such quantities in early days in the basin around Weaverville. The new ground is now being developed.

The few quartz mines around White River, in Tulare County, did not make quite so much of an output as in the previous year.

While Tuolumne County shows a slightly increased yield for 1900 over its previous year's record, yet it takes third place in rank among the counties instead of second, as in 1899, being exceeded in both gold and total output by Nevada and Calaveras counties. This is the same rank Tuolumne County held in 1898. The mines in Tuolumne County are practically all quartz and there are several large producers. Among them are the Longfellow, at Big Oak Flat; Consolidated Eureka, at Carters; Eagle-Shawmut, at Chinese Camp; Confidence, at Confidence; App Mining Company, at Jamestown; Dutch, at Quartz; Consolidated Golden Gate and Sulphuret, at Sonora; Black Oak, at Soulsbyville, and Jumper Gold Mining Syndicate, at Stent. The last named is the largest producer in the county. There are several "pocket" mines in this county, which may make a large production in one year and little or nothing the next. The dry season of 1900 had a bad effect in this county, as lack of water compelled large mills to close for a time in the fall; otherwise a larger yield would have been shown.

There are very few mines being operated in Ventura County, and the total yield is about one-third less than in the previous year.

Yuba has usually been known as a placer-mining county, and most of its mines are of that character; still the largest producer, as in other gravel-mining counties, is a quartz mine which is located at Browns Valley. The county shows an increase of \$94,692 in product over the yield of 1899.

The following table shows the distribution of the total gold and silver

product of California, by counties, in the calendar year 1900, based on returns received from producers at the mint of the United States at San Francisco:

PRODUCT OF CALIFORNIA, BY COUNTIES, 1900.
RECAPITULATION.

County.	Gold.	Silver.	Total.
Amador.....	\$1,373,788	\$14,915	\$1,388,703
Butte.....	485,589	13,082	498,671
Calaveras.....	1,649,126	80,762	1,729,888
Del Norte.....	3,483	-----	3,483
Eldorado.....	368,541	25,129	393,670
Fresno.....	22,346	479	22,825
Humboldt.....	109,444	283	109,727
Inyo.....	213,655	113,493	327,148
Kern.....	805,252	147,736	952,988
Lassen.....	19,807	676	20,483
Los Angeles.....	5,508	-----	5,508
Madera.....	104,134	3,833	107,967
Mariposa.....	157,663	13,853	171,516
Mono.....	670,200	75,921	746,121
Nevada.....	1,812,036	66,841	1,878,877
Orange.....	2,407	-----	2,407
Placer.....	986,155	12,058	998,213
Plumas.....	365,210	4,159	369,369
Riverside.....	149,292	6,848	156,140
Sacramento.....	176,007	986	176,993
San Bernardino.....	247,949	172,759	420,708
San Diego.....	335,937	19,810	355,747
Shasta.....	733,467	635,640	1,369,107
Sierra.....	659,696	3,463	663,159
Siskiyou.....	951,397	13,986	965,383
Stanislaus.....	21,212	-----	21,212
Trinity.....	571,605	16,567	588,172
Tulare.....	10,445	433	10,878
Tuolumne.....	1,596,891	62,367	1,659,258
Ventura.....	2,562	-----	2,562
Yuba.....	280,366	4,265	284,631
Undistributed.....	972,185	-----	972,185
Total.....	15,863,355	1,510,344	17,373,699

The following table shows the output of gold and silver in California for the years 1899 and 1900, with the gains and losses of the respective counties in comparing the two years, the figures being taken from returns by producers to the mint of the United States at San Francisco:

COMPARATIVE OUTPUT FOR 1899 AND 1900.

County.	1899.	1900.	Increase.	Decrease.
Amador.....	\$1,551,770	\$1,388,703	-----	\$163,067
Butte.....	491,855	498,671	\$6,816	-----
Calaveras.....	1,275,377	1,729,888	454,511	-----
Del Norte.....	4,450	3,483	-----	967
Eldorado.....	412,911	393,670	-----	19,241
Fresno.....	18,142	22,825	4,683	-----
Humboldt.....	69,059	109,727	40,668	-----
Inyo.....	171,716	327,148	155,432	-----
Kern.....	870,224	952,988	82,764	-----
Lassen.....	28,898	20,483	-----	8,415
Los Angeles.....	13,132	5,508	-----	7,624
Madera.....	74,050	107,967	33,917	-----
Mariposa.....	565,036	171,516	-----	393,520
Mono.....	744,616	746,121	1,505	-----
Nevada.....	2,189,294	1,878,877	-----	310,417
Orange.....	-----	2,407	2,407	-----
Placer.....	1,101,287	998,213	-----	103,074
Plumas.....	381,166	369,369	-----	11,797
Riverside.....	165,010	155,140	-----	8,870
Sacramento.....	115,906	176,993	61,087	-----
San Bernardino.....	290,202	420,708	130,506	-----

COMPARATIVE OUTPUT FOR 1899 AND 1900—Continued.

County.	1899.	1900.	Increase.	Decrease.
San Diego	\$333,650	\$355,747	\$22,097	-----
Shasta	1,069,932	1,369,107	299,175	-----
Sierra	450,474	663,159	212,685	-----
Siskiyou	991,871	965,383	-----	\$26,488
Stanislaus	10,000	21,212	11,212	-----
Trinity	591,596	588,172	-----	3,424
Tulare	13,610	10,878	-----	2,732
Tuolumne	1,650,880	1,659,258	8,378	-----
Ventura	3,990	2,562	-----	1,428
Yuba	189,939	284,631	94,692	-----
Undistributed	-----	972,185	972,185	-----
Total	15,840,043	17,373,699	2,594,720	1,061,064
Total increase, 1900	-----	-----	1,533,656	-----

The following table shows in detail, by counties, the source of the gold and silver in California in 1900:

SOURCE OF GOLD AND SILVER, 1900.

County.	Quartz.	Placer.	Hydraulic.	Drift.
Amador	\$1,347,156	\$26,690	\$2,300	\$12,557
Butte	202,129	243,123	18,274	35,145
Calaveras	1,663,751	2,576	42,646	20,915
Del Norte	-----	3,050	433	-----
Eldorado	339,634	37,279	6,277	10,480
Fresno	16,215	3,410	3,200	-----
Humboldt	-----	33,201	76,526	-----
Inyo	327,118	30	-----	-----
Kern	937,959	10,029	-----	5,000
Lassen	20,483	-----	-----	-----
Los Angeles	1,919	3,589	-----	-----
Madera	105,467	2,500	-----	-----
Mariposa	165,374	6,142	-----	-----
Mono	737,371	8,750	-----	-----
Nevada	1,576,856	67,904	156,811	77,306
Orange	-----	2,407	-----	-----
Placer	106,303	113,645	157,452	620,813
Plumas	212,908	50,816	95,884	9,761
Riverside	156,140	-----	-----	-----
Sacramento	-----	50,015	17,052	109,926
San Bernardino	363,708	57,000	-----	-----
San Diego	352,747	3,000	-----	-----
Shasta	1,357,350	4,298	7,459	-----
Sierra	416,628	44,729	136,860	64,942
Siskiyou	570,304	29,969	344,464	20,646
Stanislaus	-----	5,065	300	15,847
Trinity	263,929	79,839	229,794	14,600
Tulare	10,868	10	-----	-----
Tuolumne	1,647,355	11,345	450	108
Ventura	2,562	-----	-----	-----
Yuba	183,758	29,839	70,834	200
Undistributed	972,185	-----	-----	-----
Total	14,058,187	930,250	1,367,016	1,018,246

The wages of miners vary greatly in the different counties of California and even in different parts of the same counties, as well as in the same camps where two or three kinds of gold mining are carried on, as drift, hydraulic, and quartz. Speaking generally, the wages are lower in mining auriferous gravel than in quartz or deep mining. The rate for Chinese miners is uniformly lower than for white. The highest wages are paid in the southern part of the State, especially in Mono County, and the lowest in the northern coast counties where only gravel is worked and the Chinese are more numerous. In the upper or northern part of the State a good many are employed by the month, with or without board, but usually the wages are by the day.

The highest wages are paid in the quartz-mining counties, where there is little or no gravel mining.

In Amador County most of the miners work for \$2.50 per day, though in some mines \$2.75 is paid, and in a few \$3. In one camp where there are 375 men at work in quartz mines, the wages vary from \$2 to \$2.50, \$2.65, \$2.75 to \$3, according to class of work underground and on surface. In Butte County the prevailing rate is \$2.50 per day, though in the largest quartz mine in the county some are paid as high as \$4. In a few gravel mines they get \$50 per month and board. There are many Chinese in this county, but most of them work for themselves in a small way.

Calaveras County gives employment to 1,512 miners, and 550 of these are at Angels camp, where the most productive gold mine of the State is situated. At this camp the miners receive from \$2.50 and \$2.66 up to \$3 per day, but the average is about \$2.75. Where miners get \$2.50, machine men get \$3, shaft men \$3, engineers \$3.50, and laborers \$2.25. In the placers, at some camps, the Chinese get \$1 per day and whites \$2. In most camps of the county the rate is \$2.50 per day. Few miners are at work in Del Norte County on the ocean beach sand mines and gravel claims, and the average rate is \$2 per day. El Dorado County pays, generally, \$2.50 per day with a few instances where \$3 is paid. In the Fresno County placers men are working for from \$1.25 to \$2 per day, while \$2.50 is paid in quartz mines. At the ocean beach sand mines, in Humboldt County, they pay \$2 per day or \$35 a month and board, and at the hydraulic mines \$40 per month and board. In Inyo County the general rate is \$3 per day, though in the largest camp some get \$3.50 and a few \$4 per day. In Kern County the rate varies materially, though \$3 may be said to be the average, while in some camps it is \$2.50, or \$2 and board. At Randsburg, the largest camp in the county, it is mainly \$3, with some at \$3.50. The most important mine there, employing 125 men, pays an average of \$3.25 per day for miners.

The miners in Lassen County get uniformly \$2.50 per day, and in Los Angeles County about the same, though there are some working for \$2.25, and others at \$3. In Madera County the rate runs from \$2 to \$2.50 and \$3. The largest mine, employing 60 men, pays \$2.50.

In Mariposa County the rate is usually \$3 and \$2.50 for outside men. At Coulterville, the largest camp, the wages are uniformly \$3 per day.

Mono pays the highest wages of any county in the State, \$4 per day, though in some camps they pay \$2.50, or \$3 and board. At Bodie, where there are 300 men employed, the rate is \$4 for underground and \$3 for surface men.

In Nevada County the rate of wages in the quartz camps is \$3 per day, and \$2.50 for shovelers and car men. In the hydraulic and drift mines the rate is generally \$2.50, and, in some instances, \$2.75. The Chinese get \$1.50 per day. There are 1,989 miners employed in Nevada County, the largest number in any county in the State.

Placer is essentially a gravel mining county, where the general rate of wages is \$2.50 per day in drift mines. At some drift mines, however, where both whites and Chinese are at work, the average will be \$2.20, and at quartz mines \$3 is paid. There are more miners at Michigan Bluff than elsewhere in this county, and there a uniform rate of \$2.50 is paid. At Dutch Flat, where there are many Chinese, they get \$1.50 per day.

In Plumas County, where most of the mining is in auriferous gravel, the rate of wages varies greatly. In some camps it is \$1.50 or \$1.60

per day and board, and \$1.75 or \$2 and board. In others it is \$1.75 for Chinese and \$2.50 to \$3 for whites, and in some instances \$40 to \$50 per month and board. At the point where the most men are employed the wages average \$2.75 per day. In the quartz camp of Perris, in Riverside County, wages run from \$2.25 to \$2.50 and \$3.25, according to character of work; and around Salton they get \$2 per day and board. At one mine, with 20 men at work, they pay \$3.25. In the gravel mines around Folsom, Sacramento County, the men are paid \$1.50 and \$2.10 per day and \$10 per week. The largest mine employs 60 men at \$2.50 per day. The rate of wages in San Bernardino County is about \$3 per day, though in some cases less is paid, and at the camp where most men are employed (Doble) the average rate in quartz mines is \$2.75. San Diego County pays miners an average of \$2.50 per day, though in some mines it is \$3. In San Luis, Obispo County, the rate is \$2.50.

Shasta County has 1,516 miners at work, about one-third of the number being at Fielding, where the Mountain Copper Company's mines are situated. The wages there vary from \$2.10 to \$2.75 per day. Throughout the rest of the county the wages average \$2.50 per day. In a few places the men are paid \$2 per day and board, and \$50 per month and board. In the mines at Knob, where there are 200 men, the wages are \$2.50. In Sierra County the wages run from \$2 to \$3 per day, according to character of work. In some places they get from \$2 to \$2.25 per day and board, and in others \$60 to \$65 per month and board. Chinese are hired at \$25 per month. The quartz miners get \$3.

Siskiyou County mines give employment to 1,542 men, and varying rates of wages are paid. There are many Chinese in this county, and they usually get \$1.50 per day. Varying rates in different camps are \$35 per month and board, \$40, \$50, or \$60 per month and board, according to nature of work. At Fort Jones and vicinity the rate is \$2.50 per day, or \$50 to \$60 per month and board, which may be called the average of the county, though in some mines only \$2 per day is paid. Gravel mining, mainly hydraulic, largely predominates in this county. The largest quartz mine in the county, employing 75 men, pays an average rate of \$2.50 per day.

Trinity is largely a gravel mining county, though there are some quartz mines being operated successfully. At the largest gravel camp the average rate for whites is \$2.50 per day; the Chinese get \$2 per day when hired by white people, and \$20 per month when hired by Chinese. At the largest quartz camp the rate is \$2.50 per day. At some camps the pay is \$1.50 and board; \$2 and board, or \$40 to \$50 per month and board. In a few places \$2.75 per day is paid, but the average rate is \$2.50. In Tulare County wages are from \$2 to \$2.50 per day. Tuolumne County pays on the average \$3 per day to miners. At the most important quartz mining center the rates are as follows: Miners, \$3 per day; car men and "muckers," \$2.50; top men, \$2 to \$2.50; blacksmiths, \$3.50; mill men, \$3.50 to \$4; amalgamators, \$3.50 to \$4; concentrator men, \$3 to \$3.50. At other camps miners are paid \$2.50, \$2.75, \$3, \$3.25, and \$3.50, according to character of employment. Ventura County pays an average of \$3 per day. Yuba County has an average rate of \$2.50, though in some cases the pay is \$3 per day.

The appended table shows, by counties, the number of men employed in gold and silver mines in California during 1900. It shows also the number at work in copper and lead mines which produced any gold

or silver. The total number employed is 19,166, an increase of 465 over the previous year. The table is made from returns sent to the mint of the United States at San Francisco by producers and from answers from postmasters, express agents, gold-dust buyers, and others in the various camps. The number does not include the nomadic prospectors in the various counties, but is intended to cover those regularly employed in mining, either by employment with companies and private mines, or working claims for themselves:

MINERS EMPLOYED IN CALIFORNIA, 1900.

County.	Number of men.	County.	Number of men.
Amador	1,313	Plumas	590
Butte	719	Riverside	225
Calaveras	1,512	Sacramento	139
Del Norte	47	San Bernardino	516
El Dorado	842	San Diego	295
Fresno	111	San Luis Obispo	6
Humboldt	120	Shasta	1,516
Inyo	285	Sierra	925
Kern	835	Siskiyou	1,542
Lassen	75	Stanislaus	25
Los Angeles	45	Trinity	964
Madera	228	Tulare	33
Mariposa	560	Tuolumne	1,481
Mono	473	Ventura	11
Nevada	1,989	Yuba	256
Orange	12		
Placer	1,446	Total	19,166

The following table shows the amounts of the gold and silver of California in 1900, as to source of production. The term “placers” includes surface placers as well as “deep” gravels worked by hydraulic or drifting process. The gold from the copper and lead ores is included in that from the quartz. The silver, however, from these sources is given separately.

DISTRIBUTION OF THE GOLD AND SILVER PRODUCT OF CALIFORNIA FOR THE CALENDAR YEAR 1900, AS TO SOURCES OF PRODUCTION.

Gold:	Fine ounces.
Quartz	607,484
Placer	159,905
Total	767,389
Silver:	
Quartz	599,069
Placer	15,343
Lead ores	54,713
Copper ores	499,032
Total	1,168,157

The amount of bullion of California production recorded at United States mints and assay offices and by private refineries and smelters during the calendar year 1900 was as follows:

Gold, 853,969.814 standard ounces; value, \$15,887,810.35.
 Silver, 1,214,065.34 standard ounces; coinage value, \$1,412,730.13.

The entire mineral product of California for 1900, including all min-

eral substances and their value, is shown in the following table from Bulletin No. 21 of the California State mining bureau:

MINERAL PRODUCT OF CALIFORNIA FOR 1900.

Description.	Quantity.	Value.
Antimony	tons 70	\$5,700
Asbestos	do 50	1,250
Asphalt	do 12,575	253,950
Bituminous rock	do 25,306	71,495
Borax:		
Refined	do 1,602	165,036
Crude	do 24,235	848,215
Cement	barrels 52,000	121,000
Chrome	tons 140	1,400
Clay:		
Brick	M 137,191	905,210
Pottery	tons 59,636	60,956
Coal	do 176,956	535,531
Copper	pounds 29,515,512	4,748,242
Fuller's earth	tons 500	3,750
Gold		15,863,355
Granite	cubic feet 311,803	295,772
Gypsum	tons 2,522	10,088
Lead	pounds 1,040,000	41,600
Lime	barrels 312,517	283,699
Limestone	tons 32,791	31,532
Lithia mica	do 440	11,000
Macadam	do 360,597	262,570
Magnesite	do 2,252	19,333
Manganese	do 131	1,310
Marble	do 4,103	5,891
Mineral paint	do 529	3,993
Mineral water	gallons 2,456,115	268,607
Natural gas	cubic feet 40,565,500	34,578
Paving blocks	M 1,192	23,775
Petroleum	barrels 4,329,950	4,152,928
Pyrites	tons 3,642	21,133
Quartz crystals		18,000
Quicksilver	flasks 26,317	1,182,786
Rubble	tons 428,690	299,072
Salt	do 89,338	204,754
Sand:		
Glass	do 2,000	2,000
Quartz	do 200	200
Sandstone	cubic feet 378,468	254,140
Serpentine	do 350	2,000
Silver		1,510,344
Soda	tons 1,000	50,000
Slate	squares 3,500	26,250
Tourmaline		500
Turquoise	pounds 500	20,000
Total		32,622,945

METHODS OF MINING.

[From Bulletin No. 18 of the California State mining bureau, October, 1900.]

The mining methods in vogue on the Central Lode of California are not, in the opinion of the writer, those calculated to produce the best results when viewed from the standpoint of economy. They are, with few exceptions, the methods of thirty, of forty, and of fifty years ago, and some of the practices are so primitive in their nature as to savor of past centuries rather than of decades.

A policy which obtains throughout the mining districts of California is that of demanding prompt returns from ore development, which is, of course, very desirable, but which in many cases works ultimately to the disadvantage of the owner, and the manager or superintendent is so completely handicapped that he is unable to make substantial headway.

There are certain districts where this demand for "immediate returns" does not act so disadvantageously, but in the mines of the Central Lode it is undoubtedly a short-sighted policy. The reason for this will become apparent when it is understood that with few exceptions the ground is heavy, often swelling and crushing the heaviest timbers.

The usual practice is to drive a crosscut or drift from a station at the shaft to the vein. This may or may not at once encounter ore. If not, a drift is driven

along the fissure, which must be timbered in the most substantial manner. These drifts are usually not less than 7 feet high, 4 to 5 feet wide at the top, and 7 to 8 feet at the bottom. These dimensions are all inside the timbers. It usually makes little difference whether the cutting is in ore or not—the ground is generally heavy. The fissures are often from 10 to 40 feet wide, and the miners (of Amador County particularly) are well acquainted with the danger, difficulty, and expense attending this kind of mining. As soon as pay rock is encountered it is hoisted and sent to the mill, and the drift continues, while overhand stopes are started and development proceeds. It may be several hundred feet to the limit of the property, and is often over 1,000 feet, and this heavy swelling, sometimes running, ground must be kept open until the entire level has been explored and the ore to the level above all extracted and sent to the surface. An idea of the character of some of this ground may be gained from the statement that in a certain instance a drift of usual size being driven a distance of 200 feet, at the rate of 5 feet or more daily, under contract, could not be completed before it became necessary to return to that portion first driven for the purpose of retimbering. The timbers employed in holding ground of this character are usually 20 to 30 inches in diameter, and it is no uncommon thing to see these immense logs, a few weeks after being put in place, split, crushed, and broken as though they were incapable of offering any resistance to this all but irresistible force.

The advisability of cutting the main gangways in the hard rock of the walls, either foot or hanging, and reaching the vein by a system of crosscuts is advised. This has not as yet at this writing been attempted, but its feasibility and desirability can readily be appreciated when the character of the main fissure, as above explained, is understood.

These main gangways, being driven in, say, the foot wall should have crosscuts extending at right angles to the direction of the main gangway. These should be disposed at stated intervals for the purpose of prospecting the fissure and to render accessible the ore discovered. In slate the main gangways should be at a distance of 40 to 60 feet from the vein; where in greenstone, they may be driven nearer the vein. The crosscuts should be driven at stated intervals, a greater or less distance apart, according to the character of the ground adjacent to the vein. When the ground is very bad the crosscuts should be closer, and when less so, at longer intervals. In most cases, if driven at intervals of 240 feet, the distance will be found convenient. Raises should always be put through, connecting with the level above, before stoping is commenced. Very often this important matter is neglected, owing, as previously stated, to a desire to realize a profit on the ore as quickly as possible. These raises should be put in about 60 feet apart. This, beginning 30 feet from the point where the crosscut reaches the vein, will admit of four raises within the 240-foot section suggested, the vein being worked 30 feet each side of the raise.

When putting through raises it is really an economical plan to sink a winze from the level above to meet the raise. By this means ventilation will be more quickly obtained, and the additional work which men can accomplish will soon pay for the increased cost of sinking the winze. Men will not and can not perform the best work most expeditiously in a foul atmosphere, though this fact seems to be lost sight of by many mine owners.

In addition to the great disadvantage of foul air, when the raises are not put through the heavy timbers must be hoisted through the raise into the stopes by means of block and tackle, at great expense of time. If the raise were through, the cost of handling these great timbers would be very materially reduced by lowering them through the raise from the level above to the floor of the stope where they are to be placed in position.

With the lateral drifts and crosscuts completed and drifts driven on the vein, with raises through to the next level above, the work of stoping can be carried on at as many points as may be desired, and in a few weeks, or months at most, the greater portion of the excavation made on the vein, where not filled, will collapse and be closed up forever. This works no harm or inconvenience, as the main lateral drift remains open.

When operating in this manner, filling for the stopes may be taken from the hanging wall by driving an inclined raise into it and opening out a chamber. The rock broken in these chambers will pass by gravity down into the stopes beneath and fill them, little or no shoveling being necessary. This method of mining and filling, when properly carried out, will prove more safe and far less expensive than some of the methods heretofore employed in California mines. In some mines, if stoping be expeditiously prosecuted in the manner above suggested, no filling will be required, the timbers affording all the support necessary; but in most cases filling of the stopes is advised. Where the hanging-wall country adjacent to the

vein has a tendency to cave, it may be that the inclined upraise for the purpose of obtaining filling for the stopes may be inexpedient. In that case a horizontal crosscut may be driven to the solid ground of the hanging, that portion nearest the vein being securely timbered. The filling must then be distributed by means of wheelbarrows.

These filling chambers may be worked with hand or power drills, large or small, as seems desirable. One of the greatest items of mining expense, as now practiced, is that of constantly relieving swelling or running ground, and retimbering. When the ore shoot is attacked in sections by cross-cuts from the lateral drift, any particular section need remain open only a few months at most, instead of two, three, or more years as now.

Another advantage may be derived by driving an intermediate level midway between the main levels, if the ground is particularly bad, and connecting with the cross-cut or gangway beneath by a raise. In this manner the floor of the lower main level need only be maintained about half the time that would be necessary if all ore were sent down to the main level through a mill hole extending upward 100 feet, more or less, and connecting two main levels. This plan would, of necessity, require that a raise be cut through solid rock from the vicinity of the main gangway to the foot wall of the vein, reaching it about midway between two levels. Each of these raises would have an approximate height of 45 to 60 feet, and would cost, perhaps, when timbered, \$500; but the expense of keeping open the level in the vein would soon offset this expense if the ground were very bad.

Timbering.—The timbers employed in the mines of the central lode are uniformly large—18 to 30 inches in diameter—and the method of framing and placing them varies somewhat, but is usually, in the larger stopes, some modification of the system known throughout the world as the Nevada square-set. The placing of these timbers is accomplished often under great disadvantage and, in some instances, with considerable evident danger. The men selected for this work usually represent the finest type of physical manhood, for no others could accomplish the arduous task expeditiously. As to the relative merits of the respective methods of framing these heavy timbers, it seems only necessary to say that those systems involving the least framing with ax and adz underground, and consequent smaller loss of time in placing timbers in position, are the methods best adapted to regular practice.

In some mines an objection is raised to the employment of sills on the main floor of a level, for the reason that the sills rot before the stopes can be carried through from any level to the next above. In most cases there is no excuse for this. A reprehensible practice, which is found almost universal in these mines, is that of attempting to carry up stopes of too large a superficial area, and this practice is responsible for some disastrous caves which have occurred in various mines. A stope of smaller superficial area can generally be carried from one level to the next above more quickly and safely than a large one, and in most cases, even by the present "old fashioned" methods of mining, a stope of small sectional area may be carried through in a few months—long before the sills become weakened by reason of decay. If the development of the mine were carried on well in advance of the extraction of the ore, it would not be found necessary to open these large stopes, as a number of smaller stopes would supply the same amount of ore daily as is usually drawn from one, two, or three large stopes, and it would be found that ultimately the cost would be materially less, as in most cases there would be no loss of ore, no disastrous caves, and work could be accomplished more expeditiously and more cheaply.

Filling.—There are few veins on the central lode where, by present mining methods, filling is not absolutely necessary, though by the adoption of the lateral foot wall gangway system heretofore suggested in some of the smaller mines, filling might to some extent be dispensed with, the walls being allowed to collapse after removing the ore.

Material for filling is usually obtained from cross cuts and drifts driven in prospecting, and from chambers cut in the walls of the veins, generally the hanging wall. There are few veins on the lode so small as to make enough waste in stoping to fill the excavation. Ordinarily all the rock removed from the pay shoot goes to the mill, and filling must be obtained elsewhere. In some of the larger mines, where the veins are of great size, 40 to 100 feet or more in width, it is not uncommon to find the entire vein removed for a distance along its strike equal to and often much greater than its width, the entire area overhead resting upon the props reaching from the topmost set of timbers to the roof. There may be three, four, or more floors in place, and the stope may be found filled from the sill floor to within a floor or two from the top; but it is clearly evident that in a stope of

the size indicated, this filling can afford but little if any support to the hanging wall, and none at all to the back of the stope.

Failure to recognize this fact has resulted disastrously in more than one mine. The filling must be placed in such a manner as to support the back of the stope over as large an area as possible, and a portion of this filling, at least, must be placed by hand, for it is clearly evident that should any subsidence occur in a stope approximating 100 feet square, timbers can not be depended on to support the great weight. In a stope having a width and length of 100 feet and carried up four floors in height, there would remain between the top set and the floor of the level next above (65 feet) not less than 50,000 tons of ore. Should this become "dead weight," each post of the sets in place would have to sustain a load of several hundred tons of ore in addition to the weight coming from ore and filling in levels above, and to this must be added the greater pressure coming from the direction of the hanging wall. This weight or pressure will vary greatly in different mines, depending upon the character of the ground, the condition of the walls, and to no small extent upon the angle of dip of the vein. Were the enormous weight of this great shifting mass of rock equally distributed, there would be less probability of a cave; but often, the weight being transferred from point to point, owing to the mobility of the ground, the pressure upon some given point becomes greater than the timbers can sustain, and a single line of sets once forced out of position renders the remaining sets less secure than before, and general collapse results; and most miners are familiar with the dangers and extraordinary expense incident to the recovery of a caved stope and the extraction of the shattered masses of ore from the zone above the cave. In veins having vertical walls the danger of caves is much lessened, but the mines of the California gold belt dip at all angles ranging between 30 and 85 degrees, the greater number being between 45 and 70 degrees, below the plane of the horizon. This being the case, the pressure upon timber sets is exerted diagonally and not directly downward upon the posts of the sets. Naturally this renders the square, or rectangular, sets less capable of sustaining the weight and pressure. In some mines diagonal braces are set in to take this hanging-wall pressure more directly, but timber will not hold it.

In consideration of the above facts, the absolute necessity of filling becomes apparent, and the necessary preparations to this end should always be promptly made in order that the filling of the stopes be not too long delayed. Filling must be carried on contemporaneously with ore extraction, and in stoping the excavations should be carried upward in sections of relatively small superficial area, the filling being packed as close to the back of the stope as possible. Where the veins do not greatly exceed 15 feet in width, the conditions are essentially changed, as in such cases the stopes may be timbered with stulls set slightly above a right angle to the dip of the walls. Most mines, where the walls are sufficiently firm, are timbered in this manner when the distance between walls admits of it. The conditions are so variable in these different mines, and often in different parts of the same mine, that the methods of timbering embrace almost every phase known in practice. The various methods of timbering employed in California mines and elsewhere were described and illustrated by the writer in Bulletin No. 2 of the California State Mining Bureau, February, 1896.

Drainage.—A very important factor in the economy of mining is the water encountered in the underground workings, and an ever-present question is the most inexpensive method of removing this incoming water from the mine. It is accomplished in three ways: By natural drainage through tunnels, by means of pumps, or by bailing. This subject has been exhaustively treated in Bulletin No. 9 of the State Mining Bureau, by Hans C. Behr, M. E., and it is unnecessary to more than refer to it here. On the central gold belt, and in fact throughout California, the large majority of mines bail water from sumps at the bottom of the shafts, or from tanks situated at various levels, where water descending from the surface and upper levels is caught.

Where the inflow of water is large, and the shafts are poorly equipped with hoisting machinery, with crooked, rough tracks or skids, the problem of bailing water, hoisting ore and waste, and carrying on development work—particularly that of sinking in the shaft—becomes a serious one, and sometimes it necessitates shutting down all work in the mine except that of sinking. Where this very undesirable combination of conditions is found, steam pumps are the most satisfactory, and it may be said that there is a growing tendency to the more extensive employment of steam pumps in mines of the Pacific coast. In many cases steam pumps are found replacing the Cornish pumps.

THE COST OF MINING.

Another consideration is the cost of mining. This is something which can never arbitrarily be determined until the character of the mine has been demonstrated. The width and length of the ore shoot must be known, and the character of the walls ascertained. The probable quantity of water which will have to be handled is always problematical, and, as a matter of course, the character of the walls and vein material itself will determine the method and expense of timbering. It is not uncommon to hear it said that in California mining and milling can be accomplished, under favorable conditions, for less than \$1 per ton, but these conditions so rarely obtain, even in California, as to scarcely be worth mentioning, for they by no means constitute or illustrate the typical features of California mining. There are mines in slaty rocks not particularly hard, where the veins are 3 to 7 feet in width, which, being worked through tunnels and having free water power, are operated at a very low cost, but even this class of mines does not represent the majority, indeed, such constitutes a very small minority.

In the greater number of mines in this State, operations are conducted through shafts, which necessarily increase the expense of mining. In the central gold belt the mines vary so greatly in size, depth, character of ore and wall rocks, and quantity of incoming water, that a statement of cost would convey but little information and comparison would be valueless unless accompanied by a complete knowledge of existing conditions and an itemized cost sheet. At a number of large mines elaborate cost sheets are kept, and to a number of these the writer has been given the freest access. The cost of mining in the larger mines, under ordinary conditions, may be fairly represented by the cost sheet of the Wildman Company at Sutter Creek, which has been kindly furnished by the superintendent, Mr. John Ross, jr.:

DETAILED AVERAGE COST OF MINING ONE TON OF ORE FOR THE YEARS 1896, 1897, AND 1898, AT THE MAHONEY MINE OF THE WILDMAN COMPANY.

Item.	Total cost for 134,886 tons.	Cost per ton.
		<i>Cents.</i>
Timbers.....	\$24,499.18	18.163
Spiling.....	4,913.05	3.642
Lumber.....	1,017.57	.755
Charcoal.....	1,242.01	.92
Candles.....	1,840.59	1.365
Powder.....	4,386.75	3.252
Fuse.....	780.16	.578
Caps.....	186.05	.138
Water.....	7,538.00	5.589
Freight.....	1,338.42	.992
Iron.....	1,224.24	.908
Steel and steel rails.....	1,417.27	1.05
Hardware.....	3,139.48	2.328
Oil.....	775.37	.575
Grease and tar.....	117.27	.087
Coal.....	229.57	.170
Miscellaneous.....	3,241.69	2.403
Powder-drill machinery.....	2,346.90	1.740
Surveying.....	667.50	.495
Cement.....	15.00	.011
Insurance.....	103.77	.977
Taxes.....	737.63	.547
Wire rope.....	636.28	.472
Office supplies.....	97.67	.072
Superintendence and labor.....	160,003.58	118.621
Total.....	222,495.00	164.950

DETAILED AVERAGE COST OF MILLING 1 TON OF ORE FOR THE YEARS 1896, 1897, AND 1898, AT THE MAHONEY MILL OF THE WILDMAN COMPANY.

Item.	Total cost for 134,901 tons.	Cost per ton.
		<i>Cents.</i>
Shoes	\$2,310.00	1.712
Dies	2,078.63	1.541
Screens	441.97	.328
Quicksilver	870.14	.645
Hardware	1,199.05	.889
Water for power	10,699.60	7.931
Freight	1,064.00	.789
Cyanide potassium	162.00	.120
Wood	220.88	.164
Charcoal, iron, and steel	97.74	.073
Oil	63.95	.047
Grease	23.13	.017
Lumber	67.34	.050
Miscellaneous and coal	1,529.46	1.134
Timbers	17.95	.013
Assay supplies	516.59	.382
Office supplies	275.73	.204
Expressage, bullion	391.16	.290
Hauling and loading sulphurets	2,354.65	1.746
Silver-plating plates	281.50	.208
Insurance	423.14	.314
Taxes	701.11	.520
Plates	86.49	.064
Superintendence and labor	16,791.58	12.447
Total	42,667.79	31.628

"The above cost includes all repairs and equipment.

"JOHN ROSS, JR., *Superintendent.*"

At the Kennedy mine, Jackson, Amador County, it may be stated, without particular reference to detail, that the cost of mining, milling, and all development work, including the new vertical shaft and expense of conducting chlorination works, is about \$5 per ton.

This comparison is made merely for the purpose of showing that comparisons of cost, without a complete knowledge of the conditions affecting such cost, are practically meaningless, and are unjust to the mine managers who are willing to furnish such figures.

It should be remembered in the case of the Wildman Company's sheet that it includes the years 1896-1898, but does not include the years 1899-1900. Within the past two years there has been a very material advance in the cost of many mining supplies and in mining machinery.

The mine cost-sheet would be affected particularly in the items of iron, steel, steel rails, hardware, power-drill machinery, wire ropes, etc., and the mill sheet would show a probable increase in cost of shoes, dies, screens, quicksilver, hardware, iron, and steel. This increase in cost of the items enumerated would raise the cost of both mining and milling, and as a matter of course would affect all other mines in proportion to the magnitude of their operations. At those mines treating the largest quantity of ore per stamp the milling cost would be lowest, and at those mines hoisting the largest tonnage of ore to the number of men employed the mining cost would be lowest.

Ordinarily, in the larger mines, the cost of timbering ranges from 30 cents to 50 cents per ton of ore extracted.

MINING MACHINERY.

There is found in the gold belt a great diversity of mining machinery, from the crude windlass to magnificent plants costing many thousands of dollars.

COLORADO.

By JAMES L. HODGES.

Assayer in charge, United States mint, Denver, Colo.

The value of Colorado's production for 1900 is as follows:

Gold (at \$20.67 per fine ounce)	\$28,869,392
Silver (coining value, at \$1.29 per ounce)	26,998,928
Lead (at \$0.0414 per pound)	6,788,232
Copper (at \$0.156 per pound)	1,543,820

The increases over the preceding year are:

Gold	\$2,603,905
Lead	737,076

The decreases are:

Silver	\$2,680,778
Copper	431,698

A limited review of operations in the more important counties is of interest.

BOULDER COUNTY.

At the junction of the foothills and the plains, about 30 miles northwest of Denver, lies the beautiful city of Boulder, the county seat of this rich mining and agricultural county. On the north and west are located the many thriving gold and silver mining camps, on the south and west large coal deposits are found, and to the south and east lies a rich section, comprising 108,475 acres of agricultural and 100,872 acres of grazing land. The coal and mining land comprises about 6,555 acres, a grand total valuation of \$6,298,854, by the assessor's rolls, which is less than one-third of the real value.

Boulder is reached by a branch of the Colorado Southern Railroad, connecting with the Colorado and Northeastern Railroad, a narrow gauge to Ward, and running through the most prosperous mining camps of the county.

Several other mining camps, not reached by railroad, have well-equipped stage lines to Boulder.

MINING ACTIVITIES.

More activity than ever before is seen in the mining camps; a great many leases have been made, and the development projected will, without doubt, largely increase the output for next year. Most of the ore is found between granite walls and is porphyritic in character. Water is encountered at about 500 feet, large pumps being generally employed in its disposition.

Steam is the power employed, though in some instances electricity

and water power exist. Plenty of coal is obtainable at a reasonable price.

The milling facilities are very good, charges ranging from \$5 to \$10 per ton, according to character and value of ore.

There were no labor strikes during 1900. Wages of miners and laborers range from \$2.50 to \$2.75 per day, and most of the mines are worked the entire year.

WELL-KNOWN PRODUCERS.

Notably among the producers in this county are the B. & M., Silent Friend, Chief Big Finger, Wellington Group, and the Morning Star, at Ward.

At Camp Frances the Big Five has an extensive plant and is working high-grade ores. Its holdings extend more than a mile in length, and include the Columbia, Niwot, and Dew Drop Odit properties. Its mill has a capacity of 150 tons per day.

At Camp Talcott development is being vigorously pushed. Here are many valuable claims and well-equipped mining plants; also a large tunnel, in 1,000 feet.

Much activity is noticeable on Gold Hill. The Nugget Mill Company is steadily operating the Eagle to its capacity.

The old Slide mine is still a heavy producer.

At Sunset much development is seen.

Wall Street camp is among the liveliest in the county. The Wood Mountain Company has enough available ore to keep running several years.

The Lucky Star is also yielding large returns.

The Wall Street tunnel is being pushed.

The Livingston and the Sphinx, at Sugar Loaf, are both good paying mines.

At Sunnyside the Yukon Mining and Milling Company are taking out \$180 and \$200 ore.

At Salina is located the Melvina, which is operating at large profit.

The Scotia, Ingram, Tambourine, Emancipation, and the Victoria Boulder are all good properties.

At Crisman is located the Logan mine.

A recent strike has been made in the Yellow Pine, a silver mine.

THE ELDORA GROUP.

The Eldora camp is very lively. The most active and heaviest shippers are the Revenge, the Mogul Tunnel, Enterprise, and Fourth of July.

At Magnolia the Ben C. Lowell is producing high-grade ore.

The wheelman tunnel, 8 miles above Boulder, on Eldora road, is in 463 feet and has cut a number of good veins, carrying gold values of \$50 per ton.

At Sunshine, 7 miles from Boulder, up the Sunshine Canyon, prosperity is in evidence.

The Inter Ocean, Monongahela, White Crow, Osceola, Grand View, and Nil Desperandum are good producing mines.

Revival is noticeable at Jim Town.

At Puzzler many claims will be worked in spring of 1901.

The Success M. & M. Company is at present working in good paying ores.

SAMPLERS AND MILLS.

Two public sampling works, the Chamberlain, of 78 tons capacity, and the Kelton, 75 tons, are located at Boulder.

Following is a list of mills in the county:

Name.	District.	Character.	Daily capacity.
			<i>Tons.</i>
Livingstone	Sugar Loaf	Cyanide	20
Nellie Bly	Magnolia	Bromide	20
Coburn	do	Cyanide	30
Morell	Sunset	5 stamps	10
Free Coinage	Gold Hill	do	10
Orphan Boy	do	20 stamps	40
Wood Tunnel	do	10 stamps	20
Salina	do	do	20
Cash	do	do	20
Gray Eagle	do	Electric belt	10
Prussian	do	Cyanide	20
Gale	do	3 stamps	50
Prince Arthur	do	10 stamps	20
Muller	Ward	do	20
Humboldt	do	do	18
Montgomery	do	do	18
San Blas	do	do	20
Dew Drop	do	Jigs	100
Modoc	do	30 stamps	60
Boston	do	40 stamps	75
Madeline	do	50 stamps	100
Giles	do	10 stamps	25
Ruby	do	do	25
Binford	do	do	20
Utica	do	20 stamps	30
Pennsylvania	Boulder	50 stamps	200
Forest	do	10 stamps	20
Kilton	do	Chlorination	12
Delano	do	do	50
Culbertson	do	60 stamps	200
Midget	Nederland	30 stamps	50
Eldora	Eldora	Chlorination	50
Silent Friend	Ward	20 stamps	30
Amalgam Co.	Sugar Loaf	Chlorination	30
Yukon	Sunnyside	Amalgamation and concentration	50
Gold Nugget	Glendale	do	25
Success	Puzzler	do	100

CHAFFEE COUNTY.

Chaffee County's production for 1900 was not up to the expectations.

In the Monarch district the Madonna mine, formerly a large shipper of iron oxides and lead carbonates, made but a few shipments, coming from lessees.

The Eclipse is idle, except for the work of several sets of lessees, mining in the upper workings for overlooked product. Some desultory prospecting has been done, but the ores are of low grade and carry little or no gold values.

Near Salida the Sadalia mine has kept up work, its product being copper ore, largely native, with very small values in gold and silver.

This mine is exceptional in that it is worked almost entirely for its copper. Copper as a rule is a by-product in ores carrying gold, silver, or lead values. The average value of the ore shipped ranges from 10 to 20 per cent copper, with about \$1 in gold to the ton.

CHALK CREEK DISTRICT.

The most active work in this county is probably to be found in the Chalk Creek district. The Mary Murphy mine, which has long been a producer of good grade ore, is still producing, though under lease to the Buena Vista Smelting and Refining Company.

The Pat Murphy mine, adjoining the Mary Murphy, is being worked also under lease, and a good ore chute has been encountered.

Much prospecting has been done on the Black Hawk mine, supposed to be on the Murphy vein, but no shipments have been made.

In Cottonwood district the work of the year has nearly all been prospecting, as also in Four Mile district, which formerly produced a good deal of gold ore, worked in stamp mills. Not one of the mills is left.

GRANITE DISTRICT.

In the Granite district considerable work has been carried on, the Belle of Granite being the steadiest producer. A number of lessees are developing on old properties, notably on the Yankee Blade.

NOTABLE TUNNEL ENTERPRISE.

Perhaps the most extensive new work undertaken in the county is the tunnel started during the latter part of the year by the Latchaw Mining Company. Through Mount Princeton it will cut a number of well-defined veins, which have yielded promising surface returns. This company owns some 60 claims in one group on Mount Princeton, which will be developed from this tunnel. Thus far the work has been done entirely by hand, but an air compressor will be installed with water as the motive power.

Some unimportant placer work by rockers has been carried on during the summer season in the vicinity of Buena Vista.

THE SMELTING AND REFINING COMPANY.

The Buena Vista Smelting and Refining Company have a matting furnace located on the outskirts of the town, apparently economically and successfully run. It is treating a mixture of siliceous ores and heavy iron sulphides from the Mike and Star mines of Leadville. These latter ores carry from one-half to 4 per cent copper and assist very materially in the values of the matter produced. This plant has also worked the ore from the Sedalia mine. The Mary Murphy ore also carries a little copper. The shaft of this furnace is 11 feet above the tuyeres, and has the air bustle placed below the tuyeres instead of above, as is usual. One of the features of this furnace is that the same company controlling the electric lighting plant of the town of Buena Vista uses its power, generated by water, to drive its blowers and for elevating the ore charges for the furnace to the charging floor, giving a decided advantage in the matter of economy over steam.

The slag produced is quite acid, averaging 40 per cent silica, 24 per cent iron, and 24 per cent lime, the balance being composed of alumina and magnesia.

Considerable zinc is met with in the Leadville ores treated, which at times gives trouble from forming accretions in the shaft of the furnace. Much zinc sulphide also enters into the composition of the matte.

The furnace runs with a cold blast and taps into a forehearth, as is the universal method in furnace practice in the State, both for lead and matte furnaces. The consumption of fuel to weight of ore treated is from 8 to 10 per cent. It is the intention of the management to erect two more furnaces of the same character.

CLEAR CREEK COUNTY.

Clear Creek County adjoins Gilpin on the east and is separated from it by a chain of mountains, ending at the forks of Clear Creek, where this stream, near the western boundary, divides into North, Middle, and South forks. The South Fork runs through Clear Creek County, its main tributary being Chicago Creek. The southeast part of the county is drained by Bear Creek and tributaries.

Along the banks of Clear Creek, in Clear Creek Canyon, runs a branch of the Colorado Southern Railway, touching the thriving mining camps Forks Creek, Floyd Hill, Idaho Springs, Fall River, Dumont, Lawson, Empire, Georgetown, and over the famous Loop to Silver Plume, reaching an elevation of 9,176 feet.

FIRST PAY PLACER BEDS.

The first pay placer beds in the State were discovered in this county by George A. Jackson, near Idaho Springs district, in 1859.

In 1864 this portion of the county was deserted on the discovery of rich veins of silver above Georgetown, which, up to 1890, was a busy and prosperous camp. The fall in the price of silver in later years resulted in prospecting more for gold, and steady development disclosed rich veins containing gold and silver in the region of Idaho Springs, Floyd Hill, Dumont, Lawson, Empire, and Fall River.

The year 1900 has witnessed more development than the previous five years, and the success of the Lamartine and New House tunnels has given mining in this county wonderful impetus.

Much Eastern money is being invested here.

GEOLOGICAL FORMATION.

The county, geologically, is made up of the granite-gneiss complex, and is traversed by a series of porphyritic dikes, trending from northeast to northwest. The veins are of the true fissure type, charged with sulphide ores carrying low values, which are easily milled at a profit, charges being from \$1.25 to \$1.75 per ton. Also in these fissures are discovered good smelting ores carrying high values.

There are 40 mills, or thereabouts, in this county, all operating to capacity. The proposition of tunneling the mountains to reach the lodes at greater depth has received much attention the past year.

NEW HOUSE TUNNEL.

The New House, the largest tunnel, is in Seaton Mountain, at Idaho Springs, 10,000 feet, and is driving at the rate of 250 feet per month.

The opening is 12 by 12 feet, designed to cut in Quartz Hill, in Gilpin County, its destination being the bottom of the shaft of the California Mine, which is 2,240 feet deep. It will cut over 400 well-known lodes. Ore bodies already cut are highly estimated.

The tunnel will be used for transportation and drainage purposes and promises much toward the future of Idaho Springs and the promulgation of deep mining in this county.

Other tunnels of prominence are the Lamartine, Wilcox, Foxhall, Tropic, Mayflower, Stanley, Mammoth, Star, Pennsylvania, Knickerbocker, and McClelland.

Several tunnels are in contemplation at Fall River, Yankee, Dumont, Lawson, Empire, and Georgetown.

At the latter place conditions for driving long tunnels are exceptionally good.

Here is located the famous Atlantic and Pacific Tunnel, now 1¼ miles toward Grays Peak, which is to be worked again, designed for railroad purposes as well as mining.

MINOR MENTION.

The leasing on royalty system prevails in this county to a great extent, though many of the development properties are being bought outright by Eastern capitalists and local corporations. Fifteen per cent is the ruling royalty on leased mines.

The mines are practically dry and free from gases. The power is water, steam, and electricity. The larger plants during the past year have introduced gasoline engines, a distinct success.

Transportation to mills and railroad is by wagon, good roads being the rule.

Few accidents were recorded during the year and labor troubles were unknown.

Wages for laborers in mines are \$2.25 to \$2.75 per day, and for engineers and timbermen \$3 to \$3.25 per day.

Regularly incorporated companies paid dividends during 1900 of \$690,000.

LIST OF SHIPPING MINES.

Following are the most prominent shipping mines in the county: Larmartine, Lucky Group, Donaldson, Little Albert, Monte Cristo, Lone Tree, Great Eastern, Great Western, Brazil, Freeland Extension, Anchor Group, Harrisburgh, Senator, Blue Ridge, Shafter, Le Roi, Mattie, Silver Age, Alpha, Galatea, French Flag, Seven-Forty, Silver Queen, Grand View, Franklin, Amy C., Freighters' Friend, Washington, Veto, Lincoln, Fraction Gem and Gem Extension, Garden, Sun and Moon, Lord Byron, Stanley, Astor, Silver Glance, Sunburst, Hattie B., Mineral Chief, Mendota, The Doric, O. P., Alaska, Colorado Central, Independence, Kokomo, Pioneer, Cunningham, Stevens, Sunset Lode, Centennial, Hansbrough Tunnel. Dupuy-Raymond Tunnel.

Many smaller mines are regular shippers.

GEORGETOWN AND IDAHO SPRINGS.

Georgetown, the county seat, is located 50 miles from Denver, at an elevation of 8,476 feet, and has a population of 1,800.

Idaho Springs, the largest city in the county, is beautifully located, 37 miles from Denver, at an elevation of 7,543 feet, with a population of 2,500.

The location of the principal mills, New House Tunnel, and larger mines makes the city the center of business for the county.

SAMPLING WORKS.

Name.	Location.	Daily capacity.
		<i>Tons.</i>
Dewey Bros.....	Georgetown.....	120
W. J. Chamberlain.....	do.....	100
Do.....	Idaho Springs.....	100
State Ore and Sampling Co.....	do.....	100
Denver Smelting and Sampling Co.....	do.....	100

MILLS.

Name.	Location.	Character.	Capacity per day.
			<i>Tons.</i>
Mixsell.....	Idaho Springs.....	Amalgamation and concentration.....	25
Anderson.....	do.....	do.....	25
Newton.....	do.....	do.....	40
Salisbury.....	do.....	do.....	60
Pioneer.....	Yankee.....	do.....	10
Do.....	Dumont.....	do.....	75
Turner.....	Idaho Springs.....	do.....	25
Lombard.....	Yankee.....	do.....	35
Specht.....	Dumont.....	do.....	20
Roberts-Jackson.....	Idaho Springs.....	do.....	100
Wilkie.....	do.....	Amalgamation.....	30
Allen.....	do.....	do.....	100
Allan.....	Chicago Creek.....	do.....	20
Mattie.....	do.....	do.....	60
Humboldt.....	Ute Creek.....	do.....	10
Osborne.....	Fall River.....	do.....	10
Kittie Clyde.....	Idaho Springs.....	do.....	10
Roberts.....	do.....	Concentration.....	100
Donaldson.....	do.....	do.....	60
Standard.....	do.....	do.....	60
Mayflower.....	do.....	do.....	50
Silver Age.....	do.....	do.....	40
Golconda.....	do.....	do.....	40
Ohio Gulch.....	Dumont.....	do.....	30
Mansfield.....	do.....	do.....	30
Lincoln.....	Idaho Springs.....	do.....	30
Smith.....	do.....	do.....	30
Cumberland.....	Yankee.....	do.....	30
Alice.....	do.....	do.....	150
Stanley.....	Idaho Springs.....	do.....	50

CRIPPLE CREEK (TELLER COUNTY).

The results of the year 1900 in the Cripple Creek districts were notable in the increased value of the output, despite several causes which tended to restrict the production of ore. Chief among these was the smelter strike of the preceding year, which caused the ore bins of the mines to become glutted, resulting in the closing down of a number of the mines in the latter part of the year. This was followed by the inability of the railroads to provide cars sufficient to move the accumulated stock. When some of the larger properties found themselves compelled to close down, they began to install larger plants of machinery, which caused delays after the possibility of regular shipping was again presented.

During the early part of the year another restriction in production was brought about by difficulties between the mills and some of the producers, regarding treatment charges. This was especially apparent in the month of April, when the production fell off nearly one third. However, lower treatment and transportation charges have enabled the immense reserves of lower grade ore to be handled at a profit.

FACTORS OF PROGRESS.

The progressive history of the district may be summed up under the factors of consolidation of mining properties, railroad extension, and new plants for ore treatment.

During the year a number of consolidations of small properties and companies have been made and in several instances large producers have consolidated their interests to settle long-existing legal contentions. It is natural that in a district where occurs such a network of veins and ore chutes every fraction of vacant ground should be located, and as a result claims overlap in a most intricate manner,

often causing interminable legal complications. The experience of the district has been that even a high-grade gold mine is not equal to the drain of a long drawn out legal contest, so that the tendency is now to compromise by consolidation of interests.

Among the consolidations thus effected was an important one between valuable Raven Hill properties, consisting of the former holdings of the Elkton, Raven, and Tornado companies.

A second case is that of the Jack-Pot-Doctor consolidation. These properties are also on Raven Hill, and during the early part of 1900 the lessees on the Doctor mine opened up one of the richest ore bodies known in the district. They immediately became involved with the Jack-Pot mine, the latter claiming the right to the ore body, and at the same time the Nugget and other properties adjoining became involved.

By order of the court a large area, including the most valuable portion of the discovery, was tied up pending the proving of the course of the ore body. After months of negotiation the Jack-Pot-Doctor Consolidated Mining Company was incorporated, and now owns all of the conflicting territory, consisting of about 70 acres. A number of other consolidations are contemplated on Beacon Hill and Squaw Mountain.

CONSOLIDATION BY PURCHASE.

The consolidations effected through purchase during 1900 have surpassed anything in the history of Cripple Creek. Among these are the large number of properties purchased by W. S. Stratton and incorporated by him into a new company. The amount paid for these holdings, as shown by the county records, is \$3,500,000, and extends on both sides of Poverty Gulch up to Globe and Iron Clad hills.

Perhaps no better index of the confidence in increased production in a district exists than in the willingness of capitalists to invest in new plants for treating the ores, in addition to a large increase in the capacity of several of the older reduction works.

It has been demonstrated that unless conditions are exceptional it is not economy to try to compete with the valley plants by treating ores right at the camp, as cost of fuel and labor so largely favors the valley.

The three original mills—the Chlorination at Gillette, the Brodie Cyanide Mill on Cripple Creek, and the Chlorination Cyanide Mill in Arequa Gulch—have closed down in the order named, so that now, outside of sampling mills, the only plant for reduction of ore right at the mines is the large cyanide mill of the Woods Investment Company, located at Eclipse, on the west slope of Squaw Mountain.

Perhaps the first mill erected directly in the interest of any one mining syndicate to treat the ores of this district was the Metallie Extraction Mill, at Cyanide, near Florence. This was built by the owners of the Victor, Legal Tender, and Granite properties, and has been in operation for a number of years, periodically, its capacity, until now has been from 350 to 400 tons daily. Then followed the Colorado-Philadelphia Chlorination Mill at Colorado City, which has increased its capacity to 350 tons a day.

NEW MILLS OF THE YEAR.

But during 1900 the following mills have been completed and put into operation: The Economie Extraction Company's Mill of the Woods Company, built to treat the ores from their properties, and the Union

Gold Extraction Company's Mill at Florence, built by the syndicate controlling the Vindicator, Golden Cycle, and Anaconda properties, and erected to treat their own ores. The Economic Extraction Company's Mill is built at the mouth of the Columbine-Victor tunnel, from which the various properties of the Woods syndicate in the vicinity of the tunnel will be tapped and the ore transported by electric trolley cars to the mills. This mill has a present capacity of 350 tons a day and is to be enlarged.

The Union Gold Extraction Company's plant at Florence was completed during the early part of December, 1900, with every appliance for the economical handling of ore from the time the cars enter the mill for unloading. There is no handling of the ore after it enters the mill, belt conveyors and elevators doing all the work. The ore is crushed to a 12-mesh size, dried and conveyed to six Pearce roasting furnaces, each of 60 tons' daily capacity. The roasted ore is then carried by screw conveyors to a point where it is elevated to a circular cooling floor, the roasted ore being continuously agitated and turned over by automatic stirrers, when it is discharged and elevated to storage bins ready for the barrels. There are three of these cooling floors, one for each two furnaces. The gold is all precipitated from the solutions by hydrogen sulphide gas. The tailings are treated by concentration on 20 Wilfley tables, 16 being used as roughing tables, the product of which is finished on the other 4, the object being to save the coarse gold which did not have time to dissolve during the chlorination.

Another new mill located at Florence during the past year is the Dorcas, for cyaniding. This mill has a capacity of from 115 to 130 tons a day, but is not quite finished, although treating some ore.

Among the older mills at Florence the National during the past year has enlarged its capacity to 200 tons a day from its former capacity of 75 tons. This is a chlorination plant.

The El Paso Mill has been running constantly through the past year, as has the Metallic Extraction Company. The general opinion among the mill men of this section is that the Cripple Creek ore, with depth, is averaging a higher percentage of sulphur and that all the ore received is showing less oxidation and that the gold is appearing more in combination with tellurium.

NEW FLORENCE SMELTER.

The largest enterprise established at Florence during the year is the Rocky Mountain Smelting Company plant. This is built on an admirable site for large extension. The furnaces thus far erected are two in number, and are matting furnaces for concentrating the values of the ore, using the iron and copper bases as a medium for recovering the gold and silver values in the ore, instead of lead, as is the case of the ordinary lead smelters in the State. The capacity of these furnaces is very large, being estimated at 400 tons a day each. A cross section at the tuyeres gives the unusual dimensions of 3 feet in width by 15 feet in length. The management does not consider the plant as belonging to the class known as "pyritic" smelters, although the product is a matte and the ores are treated without roasting. The furnace is unique, in that the slag produced carries as high as 60 per cent silica with sometimes 14 per cent alumina and as high as 12 per cent of magnesia, which is derived from using delomnite in place of limestone in the charge.

The temperature attained is much higher than in the lead furnace, approaching more nearly that required in the iron furnaces.

Despite the highly acid condition of the slag, it flows without any difficulty. To produce such a temperature with a cold blast it seems evident that a very large part of the sulphur charged into the furnace must act as fuel in conjunction with the coke, and to that extent the furnace is a pyritic smelter.

The entire plant is modern in labor-saving devices and built in the most substantial manner. It is the intention of the management to gradually add four more furnaces.

TO HANDLE PORTLAND ORES.

The Portland Gold Mining Company started during the year the construction of a large reduction mill at Colorado City, to have a capacity of 350 tons a day, intended to handle their own production.

Two other plants depending for ore on this district are the Colorado-Philadelphia and the Standard mill, both chlorination, at Colorado City. These are under one management, and each are capable of handling from 350 to 400 tons of ore a day.

FINE NEW PLANTS.

The heaviest hoisting, pumping, and compressor plants have probably been placed on the Gold Coin and Portland shafts. Aside from these, the list seems to cover nearly all of the great shippers, which are now equipped with larger and heavier machinery than can probably be found in any equal mining area in the United States.

The shaft house of the Gold Coin, which reminds one of an Eastern cotton mill, with its equipment, cost the Woods syndicate in the neighborhood of \$250,000, the hoisting engine costing \$30,000. The lifting capacity is equal to a depth of 5,000 feet. Seven hundred and fifty horsepower is required to operate the engines of this hoist, which move the double-decked cages at a speed of 1,500 feet a minute. The boilers provide 1,050 horsepower, and the compressors are probably the largest in the district, located in one building, having a capacity to operate 30 large air drills simultaneously.

PORTLAND AND INDEPENDENCE.

The Portland Company has been the greater part of the year equipping its new No. 2 shaft, and had installed a large first-motion hoist of a 20 by 48 cylinder. This has a duplex Corliss engine of especially heavy pattern. The flat rope is used in each of the shafts of this company. The maximum depth which can be reached by this hoist is 2,500 feet. An automatic stoking machine is in use at the boilers.

The Stratton's Independence Company is also installing a very heavy compressor and other machinery.

The Elkton shaft is also being equipped with a fine hoisting plant; also adding a steel gallows frame, which is a novelty in Colorado mining. The old hoisting engine of the Elkton has been removed to the Hoosier mine, on Tenderfoot Hill.

The John A. Logan has a new hoist, and has been fitted with a large compressor of sufficient capacity to furnish air for the American Eagle, Orpha May, and other properties.

The Strong mine has replaced its old plant with a larger one, installing the old plant at the El Paso, of the Gold King Company.

The Legal Tender, Princess Alice, Last Dollar, Ajax, Abe Lincoln, Chicago and Cripple Creek tunnel, Granite, Golconda, and a host of smaller properties have added to or replaced their old machinery.

As a matter of interest, the Gold Exploration Tunnel Company, operating in the Bush-Moffat tunnel, has added the first locomotive engine which is actuated by compressed air in use in this district. This engine is capable of hauling 15 loaded cars.

HEAVY DEVELOPMENT WORK.

The development work during the past year has been very great and extends to all portions of the camp. Taking the older producers, all, or nearly all, have kept development well ahead of their production; so that in some, as in the great Portland mines and Gold Coin properties, the reserves of ore are simply immense. The output from the Portland during the past year is placed at 60,000 tons, with a value of \$3,250,000.

The Elkton has sunk its main shaft 371 feet; the drifts have been extended 1,910 feet, and there has been accomplished 400 feet of upraise.

The Mary McKinney has done a great deal of development work and has proved its ore chute for a distance of 2,600 feet, and in the Ophelia tunnel, on Mary McKinney ground, the same ore body has been encountered 300 feet farther north than had formerly been opened.

Perhaps the most extensive prospecting was begun during the latter part of the year by Mr. W. S. Stratton in his new acquisition on Gold and Globe hills. Mr. Stratton's territory is divided into two groups—that located on Bull Hill and the portion on Gold, Globe, and Ironclad.

The point for the sinking of what will be, when completed, the largest and probably the deepest shaft in the district, is on the Lady Stith claim, near the summit of Globe Hill. This is a three-compartment shaft that requires 18-foot timbers, and the two cageways are 4 feet 10 inches by 4 feet 6 inches in the clear, with a large pipe and man way. This is to be sunk with all possible speed to a level with the Chicago and Cripple Creek tunnel, a depth of over 1,000 feet, for air, and then pushed down indefinitely, and from it an immense area of ground will be prospected in all directions, the intention being to establish the value of the known veins in this section at greater depth than has yet been reached.

A fine two-story brick office has been built on the Plymouth Rock properties, and a town of that name is contemplated.

The work on the Bull Hill group is well under way. Large forces have been worked on the John A. Logan, the old Union Company's properties, and the American Eagle.

The American Eagle shaft, now down 800 feet, will be sunk to a level of the John A. Logan.

The Chicago and Cripple Creek tunnel is to be pushed on into the Bull Hill territory, and laterals run from it at intervals.

The work of the United Mines Transportation Company, controlled by the Woods syndicate, has been of great importance. This is a lateral from the Columbine-Victor tunnel, which has been driven under Squaw Mountain, affording a connection between the Gold Coin, the May B., and the Economic Mill in Eclipse Gulch. The distance from the Gold Coin to the Economic Mill is 3,700 feet.

The United Mines lateral, or Bull Hill lateral, as it is known, is now

north of the Columbine-Victor tunnel a distance of 1,250 feet. It has been cut for a double track and is destined for a distance of over 3 miles, eventually to come out at the Cameron town site, owned by the same syndicate. An electric trolley system will be installed in this enterprise, which will materially lessen the cost of transporting the ore mined.

A good deal of work has been done on the old Bush-Moffat tunnel during the year. The tunnel has been pushed into Gold Hill, and a great deal of exploration has been done in the way of opening up veins which have been cut in the work of driving the main tunnel. Several companies are developing their veins from this tunnel level, and a good deal of ore is being shipped from this outlet. This tunnel is now controlled by the Cripple Creek Gold Exploration Company, and the workings, including the main tunnel and laterals, have a distance of nearly $2\frac{1}{2}$ miles.

At the close of 1900 over twelve shafts on as many different properties have reached a depth of 1,000 feet or over.

NEW TERRITORY.

During the year there has not been very much evidence of a widening of the Cripple Creek ore-bearing area. A very few shipments of fairly good grade ore, during the latter part of the year, from Galena Hill, at the northeast end of the district, and what might be considered as a part of Tenderfoot Hill, has given impetus to prospecting in that direction. Directly opposite, in the southwest portion of the district, on Rosebud Hill, what seems to be a regular chute of ore of very high grade has been opened on the Mary Nevin mine.

The Santa Rita mine, on Squaw Mountain, has apparently developed a permanent ore body of excellent grade.

The Golconda, an adjoining property, has been worked by its owner for six years, and during all this time the work has been simply prospecting and searching for ore. Upon sinking their shaft to the 600-foot level, the same ore chute which is being worked in the Santa Rita was located, and this company has become a shipper.

At the close of the year a strike of great importance as bearing on the future work of the Anaconda property was made at 850 feet below the surface. The Anaconda tunnel driven into Gold Hill, at its base, a distance of several thousand feet has never encountered ore bodies of great permanence or value. From a lateral in this tunnel the new ore body was cut, and apparently near the upper portion of the vein, and while its dimensions are not as yet known the ore is of very excellent grade, and, if it continues down, will have a very material influence regarding the ore deposits at depth in the future mining of this section of the district.

THE NEW RAILWAY.

One of the most important enterprises during the year has been the building of the roadbed into Cripple Creek of the Colorado Springs and Cripple Creek District Railway. The projected line between the two points is approximately 45 miles in length, of which, at the beginning of the year 1901, some 24 miles were in operation, and by the 1st of April it is expected that regular service will be given. By the addition of this road to the two already in the district it will be possible to relieve the glutted condition of the ore bins of the different mines.

ELECTRIC POWER FROM CANYON CITY.

The Colorado Electric Power Company, of Canyon City, has been an important factor. During the year it has furnished the power needed by 70 different hoisting plants, ranging from 10 to 100 horsepower, besides furnishing the power for several sampling mills and the light for many mines. This company has introduced a system of renting and installing electric hoists of from 5 horsepower up to lessees and proprietors, which in the aggregate means an immense saving in outlay for initial cost of plant. The power is generated by steam and the current conveyed over 28 miles to the district, where there are three distributing stations—one on Bull Hill, which supplies Bull Hill, Battle Mountain, and Raven Hill; the second supplying Gold Hill over to Cameron and Anaconda, and the third furnishing the power needed for Beacon Hill and surrounding territory. The power is only paid for when used.

DOLORES COUNTY.

The formation of the mineral zones in this county differ greatly from those of adjoining counties. In the Pioneer district the mines are in a sedimentary formation occurring in a contact between shale and sandstone. The ores are principally sulphides, carrying gold, silver, zinc, and copper. An attempt is being made to separate the zinc and lead ores by a system of concentration.

Lack of capital and modern facilities for treating the ores are some of the reasons why the mining districts of the county are not showing the progress enjoyed by other counties in this section.

The ample supply of water for milling and power purposes and a combination of minerals and fluxes necessary for local smelting suggest that the district is warranted in profitably treating the large bodies of low-grade sulphide ores.

The mines are worked generally by tunnels, and no great depth has been obtained on account of the nature of the veins.

THREE CONCENTRATING MILLS.

There are three concentrating mills with a capacity of 100 tons per day, but they are not worked to full capacity.

Electric power is principally used in the mills and mines.

The leasing system prevails to some extent, with about 20 per cent royalty ruling.

LEONE CONE DISTRICT.

In the Leone Cone district, embracing all that territory between the Dolores and West Dolores creeks, or about four-fifths of the county, the mineral resources are varied and valuable. Rich argentiferous copper and lead ores have been found, but not extensively developed.

There is but one stamp mill in this district, which has a daily capacity of 10 tons, although it has been in operation but a small portion of the year.

GILPIN COUNTY.

The "Kingdom of Gilpin" is the smallest county in the State, lying on the eastern slope of the Front Range, and is drained by the north fork of Clear Creek and tributaries.

Although the entire county is mineral bearing, the producing area

consists of about 40 square miles, known as the Sulphide belt, values being chiefly in gold, with some copper and silver.

The geological structure is granite. The veins are true fissures, varying from 2 to 20 feet, carrying in most instances high values.

The ores are iron pyrites, galena, and zinc blende.

The deepest shaft is 2,240 feet—the California mine.

Although most of the mining is lode, by shafts and tunnels, there are a great many placer beds worked by hydraulic and sluicing processes.

But little of this county has not been located on. The recorder's office shows 353 location certificates and 55 patents filed during 1900. most of the locations being old ones, abandoned and relocated.

THE LEASING SYSTEM.

There is considerable leasing done by local and foreign capital, royalties ranging from 15 to 30 per cent.

Very little inconvenience is experienced with water, although most of the larger mines are equipped with pumping apparatus.

This county is considered the best in the State for conservative mining. Wages range from \$2.50 per day for miners to \$3.25 per day for engineers and high-class labor. Old claims with hardly any development are constantly in demand for sale or lease.

Nearly all the mines are accessible to mills by good wagon roads; also by the Gilpin Tramway Company, having switches to several of the producing mines and a trackage of over 25 miles. The charge for treating ore is about \$2 per ton.

TONNAGE.

The tonnage from Black Hawk for 1900 records 3,174 cars, or 58,689 tons; shipments by wagon to Idaho Springs, 10,000 tons, making a total of 68,689 tons. As near as can be ascertained, dividends of \$250,000 were paid by pools and close corporations, showing an increase in this respect over 1899.

PRINCIPAL PRODUCERS.

The principal producing properties are as follows: Baltimore, Orphan Girl Group, Comstock, Morning Star, Hope, Newport. Eureka, Midland Group, Comet, Golden Crown, Golden Gate Tunnel, Alice, Oro Verde, Puritan, Lombard, Polaris, Enterprise, Chesapeake, Stonewall, '94 Tunnel, Lee, Betsy B., Mayflower, Holland, Meteor, Ruby, Manhattan, Cumberland, Sierra Nevada, Surprise, Man-Wide-Awake, Tiptop, Perigo, Beaver Creek Placer, Plateau, Schulz Wonder, Gold Dust, Victoria, Last Chance, Gettysburg, Independence, Gilpin, Yellow Jacket, Providence, Star, Populist Eclipse, The Fisk, American, Cook O'Neil, Carr, Puzzle, Nehema, Chamng, Belmont, Running Lode, Gregory, Bobtail, Bates, Hunter, Chicago-Carr, Horseshoe, National Tunnel, Senator, Peck, Thomas, Next President, Kathryn, Sleepy Hollow, Denmark, Buell Mountain City, Saratoga, Mabel Tunnel, Hampton, Powers, Kokomo, Gem, Crown Point and Virginia, I. X. L., Old Town, Modoc, Ivanhoe, California, Good Luck, Gladstone, Concrete, Gunnell, Gold Collar, Annex, Galena, Corydon, Adaline Pierce, Brooklyn. Many others are now being worked and will probably be numbered among the producers next year.

PRODUCTION SINCE 1859.

The value of precious metals produced from this county since 1859 reaches nearly \$100,000,000.

The Newhouse Tunnel, commencing at Idaho Springs in adjoining county, is now a realization and has passed the boundary line of Gilpin County and is boring ahead. Good bodies of ore are being opened up at from 2,000 to 2,200 feet.

The tunnel will drain the mines and be used for transportation of ore and thus permit deeper mining. It crosscuts many of the best properties in the county.

CENTRAL CITY AND BLACK HAWK.

Central City and Black Hawk are the principal cities, the first named being the county seat, located $39\frac{7}{10}$ miles from Denver and reached by a branch of the Colorado Southern Railroad. This city is built in the gulches and sidehills at an elevation of 8,500 feet and has a population of 3,100.

Black Hawk, where most of the stamp mills and samplers of the county are located, is a town of 1,600, lying nearly 1 mile south of Central City, at an elevation of 8,000 feet. Here also is the shipping point for the ores and concentrates.

During the past year some of the mills have changed from slow-drop to rapid-drop stamps. The water supply during the winter months has been low, compelling several of the mills to use steam as a motive power.

GILPIN COUNTY MILLS.

The State Ore and Sampling Company has a big plant at Black Hawk. Following is a list of the mills in operation during 1900:

Name.	Location.	Character.	Capacity per day.
			Tons.
Avon.....	Black Hawk.....	25 slow drop.....	25
Fullerton.....	do.....	33 slow drop.....	70
Hidden Treasure.....	do.....	75 slow and 10 rapid drop.....	100
Meade.....	do.....	40 slow drop.....	40
Polar Star.....	do.....	do.....	40
Eagle.....	do.....	35 rapid drop.....	75
Denver and Boston.....	do.....	80 rapid drop.....	150
Gilpin.....	do.....	50 slow drop.....	50
Rocky Mountain.....	do.....	25 slow drop.....	50
New York.....	do.....	50 slow, 20 rapid.....	100
Randolph.....	do.....	50 slow.....	50
Pennsylvania.....	do.....	35 slow, 10 rapid.....	60
Iron City.....	do.....	25 rapid.....	75
Perigo.....	Perigo.....	35 rapid.....	75
Daisy.....	do.....	15 slow.....	15
Peterson.....	Gilpin.....	do.....	15
Lombard.....	Yankee.....	do.....	15

GUNNISON COUNTY.

Mining in this county has shown greater activity than for many years. There are many mining districts and in all more or less development has been carried on, and in some of them a large amount of ore mined. The principal districts are Tin Cup, Tomichi, Pitkin, Quartz Creek, White Pine, and Gold Brick. Pitkin, White Pine, and Tin Cup have lead in operations. These districts in the past have produced several million dollars in gold, silver, lead, zinc, and copper.

At the northern end of the county the mineral lies mostly in limestone formations. In the southern end there is a zone commonly called the "Gunnison Gold Belt."

These great dikes are covered on top with a mass of conglomerate rock of varying thickness. Underneath are found numerous smaller dikes of schist, quartzite, and porphyry, and in these high-grade gold ore is found.

WHITE PINE DISTRICT.

In the White Pine district the mines have been unusually active, and over 22,000 tons of sulphide ores have been treated at the Tomichi Valley smelter, located in this district.

The North Star mine has the deepest shaft, being about 1,000 feet.

A large amount of development work has been done and about 10,000 tons of ore produced.

PITKIN DISTRICT.

In the Pitkin district the Colorado M. & M. Company has inaugurated work on a large scale. Prospecting work was done the past year by the diamond drill and large ore bodies were encountered. Deep shafts to reach the stratum which carries these values will be sunk.

EIGHT MILLS.

There are eight mills in the county, in operation a greater portion of the year, having a total capacity of about 380 tons per day.

The various stamp mills, concentrating, reduction, and smelting plants in the county have treated vast quantities of low-grade ores, and new ones are to be constructed to meet the demands for reducing this class of ore.

HINSDALE COUNTY.

The mining operations in this county during the year have been most gratifying. New and modern appliances have been added to the mills, and one new mill has been erected having a 40-ton capacity.

Several long tunnels have been driven to cut known ore bodies at a great depth.

The Ute and May mine, the oldest lead property in the county, has produced about 5,000 tons of concentrates, besides driving a crosscut tunnel in about 1,400 feet to cut the vein.

The Golden Fleece mine has shipped about \$100,000 worth of ore. The 60-ton stamp mill has been increased to 100 tons daily capacity, and a tunnel has been driven 2,050 feet and has yet 1,100 to drive before reaching the ore chute.

The veins are true fissures and ore is mostly a lead sulphide, carrying gold, silver, and copper values.

Electric power is principally used. The leasing system is largely operated in this county, probably to a greater extent than any other in the southern portion of the State.

LAKE COUNTY.

The Leadville district in 1899 and 1900 was exceedingly active after a period of depression, due to the low price of silver, very heavy flows of water, and the lower grades of ore which had to be extracted as deeper mining progressed.

With the exception of some new discoveries of oxidized ore on Carbonate Hill and the desultory extraction of small bodies left in the old workings of once prominent mines on Fryer Hill, the principal production of carbonates and oxides is from the comparatively new zone located east of the Ball Mountain fault, represented by the Resurrection group and the workings in the western end of the field by the Home, Midas, and other companies. Iron Hill should be included in this class of production, although its tonnage of oxidized ores is a variable quantity as the years pass. A very large part of the year's production of oxidized ores is due to the work of lessees, as the lease system gains in favor each year. As the former immense bodies of high grade carbonates gave out new conditions have presented

DEEP SHAFTS.

The past year's work has especially illustrated this in the unique system adopted by the Leadville Pumping Association, which undertook to unwater the great Down Town mining district. In the Leadville Basin area it is demonstrated that the minimum depth of shaft to reach the ore bodies now worked is 500 feet. In order to reach the great sulphide masses of Carbonate and Iron hills, 1,000 feet is the minimum. The consensus of expert opinion is that the maximum depth required to reach the white lime in the above areas approximates 1,500 feet. In Upper Big Evans Gulch, along the northeast trend of the Resurrection ore chutes, it has been established that the ore horizon lies from 800 to 1,000 feet below the surface. The sinking of these shafts and a large amount of prospecting by diamond drills have proven that the ore measures of this district probably do not extend to a greater depth than 1,600 feet from surface and that, with the exception of the lines of faulting, the ore measures are, in the main, continuous within and to a varying depth below the blue limestone formation, at times, as in the Maid and Henrietta mines, to the Silurian quartzite.

LEADVILLE PRODUCING AREA.

The present producing area of the Leadville district reaches from Iowa Gulch on the south to Evans Gulch on the north and from the Carbonate fault on the west to Bald Mountain fault on the east, or an irregular figure which will approximate a width of $2\frac{1}{2}$ miles by 4 miles long.

This district has for convenience been divided into the silver-lead belt extending from the Mike fault west to the Carbonate fault and the gold belt lying between the Mike fault on the west and the Bald Mountain fault on the east.

The main zone in the gold belt lies in the area included between the Weston fault and Bald Mountain fault and takes in Breece Hill, White Hill, and Printer Boy Hill, with such famous properties as the Ibex, Lillian, and Antioch, which have for years produced an ore predominating in gold values. In the Little Johnnie mine of the Ibex Companies this gold has at times been phenomenal.

GOLD BELT EXTENDING.

During the year 1900 development has extended the area of the gold belt to the northeast, crossing the Bald Mountain fault and giving some excellent producing area on Little Ellen Hill. In the same

chute lies the famous Resurrection properties. The development on Big Evans Gulch has opened up in this northeastern section very large bodies of oxidized ore, giving high results in lead, silver, and gold, although it has taken very much deeper workings to reach these ore bodies than in the earlier workings on Carbonate and Iron hills. With these deeper workings, larger plants for hoisting and pumping have had to be installed.

MINE CONSOLIDATIONS.

The advancement in mining in the Leadville district during the past year has been along the line of consolidation of old properties into new companies with large capital. This has been especially emphasized in the formation of home companies. The most striking example is that incorporation known as The Home Mining Company. This company secured a large territory within the city limits, worked through the Penrose, Star, and Bon Air shafts. This area is made up of a number of long-time leases, and is entirely in the Leadville basin. During the miners' strike of 1896 a portion of this ground was worked by the owners of the Maid of Erin and Henrietta properties, but owing to the continuance of the strike these gentlemen decided that as the mine was filling rapidly with water they would take out their pumps and abandon this ground. Two years ago the effort was made to get a sufficient number of home people interested to furnish the capital to unwater this territory and prospect the ground for the great ore chutes which were thought to continue from Carbonate Hill into this ground.

It is the history of a long and desperate struggle with a heavy flow of water with insufficient pumping arrangements and of final triumph in placing the Penrose and Bon Air shafts again in the list of producers. The year 1900 brought this enterprise to the front rank as a producer.

A GREAT FIND.

A great find occurred by one of those strange but often repeated freaks in the history of mining. The former owners had carried their drifts in two places to within 12 feet of a bonanza chute, and the present company, in sinking its Penrose shaft another hundred feet, came into this immense ore body. In prospecting the old abandoned drifts the same chute was encountered in the short distance mentioned above, and at the close of the year the ore blocked out is estimated to have a value of \$2,000,000.

Such wonderful success in rediscovering the old oxidized and carbonate zone in the basin underlying the city of Leadville has stimulated companies owning or controlling surrounding property and resulted in the formation of several new home companies, which are actively sinking shafts at different points within the city limits.

The line of development extends from the northern shaft on East Ninth street to the Bon Air shaft on the edge of California Gulch, and shows an almost continuous channel of ore.

AN IRON ZONE.

The great iron body seems to find its most extensive development in the Coronado, Midas, and Penrose, near the head of Seventh, Fifth, and Fourth streets, respectively. The iron was uncovered at 660 feet

in the Coronado during the last few months of 1900, and is undoubtedly an extension of the Midas chute, which in turn is the northeasterly continuation of the Penrose chute.

The Midas is one of the most important of the down-town shippers. During the past year its shipments have averaged 5,000 tons a month, the ore being encountered at a depth of 515 feet, and has been developed 500 feet to the Penrose mine and 300 feet toward the Coronado.

The Penrose, of the Home Company, is producing daily 350 tons, and the Bon Air and Star shafts, of the same company, 200 tons more.

MORE MINING IN THE HEART OF THE CITY.

Early in 1900 another enterprise was started, known as the Cloud City Mining Company, which secured the mineral rights by purchase from individual lot owners, paying at the rate of \$400 an acre. In this way a compact area of about 35 acres has been secured in what is known as the Stevens and Leiter addition to the city of Leadville. A shaft has been sunk in proximity to one of the shafts of the Home Mining Company, and will, in all probability, cut the Penrose ore chute. Before the shaft had penetrated 100 feet an expenditure of nearly \$200,000 had been made.

Two other enterprises on the same line were started during the year, taking in some 18 acres in the southeastern part of the city.

THE PUMPING ASSOCIATION.

Perhaps the factor which entered most largely into the success of the Home Mining Company and the other enterprises of a similar character was the Pumping Association, formed for the purpose of unwatering the Leadville basin. This association includes nearly all the leasing companies, as well as the owners of territory embraced in the Leadville basin. All mines operating within the association territory bear the cost of pumping in proportion to their output, based on net smelter returns, less cost of hauling. By means of counters on these pumps the amount pumped is computed in gallons and charged to the association at the rate of 10 cents per 1,000 gallons. Those mines which pump are credited with the amount of water they have raised.

15,000,000 GALLONS EACH DAY.

Taking the entire district, investigation shows that the flow of water which must be handled is not less than 15,000,000 gallons a day. Comparing this amount of water with the average daily tonnage of the district for the past year, we find that 28.6 tons of water are raised for every ton of ore raised. Careful estimates of the cost of pumping have been compiled and show that it costs 4 cents to pump each ton of water to the surface. Hence the cost of pumping referred to the ore makes a charge of \$1.14 per ton extracted. As the amount of ore shipped during the past year was about 803,000 tons, the cost of pumping for the year amounted to over \$915,000.

The total amounts of water is decreasing in the area affected as the country is kept drained and other mines in that area start pumping on their own account. Thus in November, 1899, the association pumped 68,018,592 gallons, while in November, 1900, the amount had fallen to 48,622,546 gallons, a decrease of nearly 30 per cent.

MR. WARWICK'S CONCLUSION.

An extract from an article by Mr. A. W. Warwick, a mining and mechanical engineer who has given a great deal of study to the subject of pumping in this district, will give data in a more tabulated form regarding the efficiency and losses in the pumps in use in the Leadville mines, with an analysis of the work done by the pumping plant at the Ibex Company's mines, from a series of working tests made by him at these mines. Referring to the district, he says:

It may be of interest to briefly consider the efficiency of the component parts of the pumping plants and the cost of pumping. The pumpmakers have introduced a method of describing the efficiency by stating the number of foot-pounds developed by 1,000 pounds of dry steam at so much pressure. This is useless from the miner's point of view, inasmuch as he does not use dry steam. The point that interests the mine owner is the amount of coal burned to pump so much water. The conventional method of stating the efficiency of a mine pump is the number of foot-pounds in water delivered by a pump when 100 pounds of coal are burned under the boiler. But few duty tests have been made of the Leadville pumps, but it is reasonable that the efficiency of the various machines used on a mine should be almost as carefully looked after as the assaying department, inasmuch as an inefficient machine will lose as much money in a year as may be lost by occasionally throwing ore over the dump in the same time. However, enough data have been collected to arrive at the average duty of the direct-acting steam pumps of the district. Taking all pumps—sinkers, small and large station pumps, etc.—the average duty will be not less than 15,000,000 foot-pounds per 100 pounds of coal. The duty of an ordinary sinker will not exceed 9,000,000; a small compound station pump not more than 17,000,000; a large compound station pump from 35,000,000 to 40,000,000; a triple expansion pump, 48,000,000. The compound condensing Jeansville pump at the Ibex has a duty of 45,000,000, which is exceedingly good for a pump placed 2,000 feet from the boilers. The Wolfton triple expansion has an approximate duty of 49,000,000. All these duties are expressed in terms of foot-pounds per 100 pounds of coal used. Of late a unit much used is the duty per 1,000,000 thermal units.

The mechanical efficiency of the very best pump is by no means high. In the direct-acting compound condensing pump engines about 30 pounds of steam are used per horsepower per hour, whereas a first-class compound condensing stationary engine uses only about 12½ pounds of steam per horsepower per hour. All the steam generated by these boilers, however, does not reach the pump engine. Some of it is condensed in the pipe and some dissipates its energy in overcoming friction in the steam machine. Finally, when the steam reaches the pump engine it exerts only a fraction of its power in doing useful work.

THE LOSSES.

The losses may be stated as follows: In the steam line, 14 to 25 per cent; friction of engine, 5 per cent; friction in pump, 17 to 22 per cent; friction in water column and suction, 5½ to 10 per cent. In other words, the amount of coal actually doing useful work is only from 40 to 60 pounds out of 100, and this 40 to 60 pounds only does the work of 18 to 25 pounds used in the first-class stationary engine.

The mechanical efficiency may be thus stated: 100 pounds of coal (such as is used in this camp) will develop 772,000,000 foot-pounds if the energy is entirely utilized. The best pump in the camp develops nearly 50,000,000 foot-pounds per 100 pounds of coal used. The efficiency is therefore 6½ per cent, or for every 100 pounds of coal burned, 6½ pounds are utilized and 93½ pounds thrown away.

Estimates of costs of pumping are based in city work on a million gallons raised 1 foot, which is equivalent to a basis of 1,000 gallons raised 1,000 feet high.

THE PUMPING COST.

The cost in Leadville on this basis of 1,000 gallons raised 1,000 feet high may be formulated as follows:

	Cents.
Sinkers using 100 pounds steam per horsepower.....	25 to 28
Sinkers using 150 pounds steam per horsepower.....	30 to 38
Small compound station pumps.....	15 to 20
Compound condensing station pumps.....	10 to 14
Triple expansion station pumps.....	7½

These costs are estimates based on known coal consumption and labor used, with estimates for proportion of cost of management, taxes, insurance, interest on capital, etc.

LITTLE JOHNNIE TRIALS.

The following are the details of duty trials of pump at the Little Johnnie mine of the Ibex Company. Barometric pressure, 19.5 inches.

Water figures.—Water delivered per twenty-four hours, 65,733 gallons, 1,136 feet high; water delivered per twenty-four hours, 1,252,390 gallons, 933 feet high. Total foot-pounds of work done in lifting water, 10,258,000,000 in twenty-four hours.

Steam figures:

Pressure at pumps	pounds above atmosphere	77
Temperature of feed water	degrees F	143
Water evaporated at boilers	pounds per twenty-four hours	0.175446
Coal used (11 per cent ash)	do	23,000
Combustibles used	do	20,670
Evaporation from 143° F. per pound of coal	pounds water	7.6
Evaporation from 143° F. per pound of combustibles	do	8.4

Test of pipe line, 6 inches diameter:

Total water evaporated per twenty-four hours	Pounds.	175,446
Water condensed and caught in separation per twenty-four hours	Pounds.	9,144
Water left in steam fed to pump engines (3 per cent)		4,989
		14,133
Dry steam delivered to pump engines		161,313

Horsepower of pump and pump engines:

Indicated horsepower from pump engine	Horsepower.	261.4
Pump horsepower		217.9
Loss due to friction and slippage		43.5

Duty of pump:

Per 1,000 pounds dry steam	Foot-pounds.	64,150,000
Per 100 pounds coal		45,000,000
Per million British thermal units		37,500,000

Steam and coal consumption:

Steam used per indicated horsepower	pounds per hour	27.9
Steam used per pump horsepower	do	33.4
Coal used per indicated horsepower	do	3.6
Coal used per indicated pump horsepower	do	4.3

Details of pump.—Duplex tandem compound condensing with outside packed plungers, made by Jeansville Company, size 15 by 28 by 7½ by 38 inches.

Pipe line.—Protected by asbestos covering, which is in turn covered with sheet iron, all joints of which are soldered.

Radiation surface of pipe, 2,050 square feet.

Water condensation per square foot per twenty-four hours, 6.89 pounds.

LEADVILLE'S REJUVENATION.

The mining industry in the Leadville district has shown a great advancement over the previous year, due in a large measure to recovery from the smelter strike of 1898 and the extremely severe winters of 1898 and 1899, but the increased output seems to have its real basis in the opening up of new territory to the southwest and northeast.

The possibilities in both of these directions are very good. The outlying districts have not changed materially, except that more activity in prospecting has been noticeable in the Sugar Loaf district, although no important strikes are reported from there.

The Arkansas Valley smelting plant, of the American Smelting and

Refining Company, has expended some \$375,000 in enlarging its furnaces and buildings, perhaps the most elaborate system of fume condensing chambers or flues in the country. This plant has ten furnaces, four of which have a capacity of 150 tons daily, and the balance are being changed to the same size. This will give this plant a daily capacity of 1,500 tons, making it by far the largest lead smelting plant in the country. The improvements include also the addition of a large amount of trackage for the handling of increased supplies of ore and fluxes and the using of large slag pots handled entirely by animal power, light tracks running to each of the furnaces.

A NOVEL FLUE SYSTEM.

The construction of the system of flues is worthy of mention. The framework of the flue is made of I-beams at regular intervals and the uprights tied together by means of a metal lathing, or latticework.

The entire surface of this lattice flue, within and without, is covered with a coating of Portland cement to a thickness of 2 or 3 inches. The bottom is made V-shaped, with doors at intervals for cleaning out. The flue has a partition, so that when cleaning out one side the entire fumes may be sent through the other side. A cross section gives an area of 256 square feet, or 25.6 square feet to each furnace.

Another improvement contemplated is to tap all lead bullion into pots and allow the molten metal to cool sufficiently for the copper impurities in the bullion to rise to the surface of the pot, where it is skimmed off as an impure copper crust, which will be charged back to the furnaces to be formed into a copper matte in subsequent working. The clean bullion will thus be taken to the merchant kettle room, where it will be run into pigs of bullion. The American Smelting Company owns two other smelting plants in Leadville—the Union and Bimetallic smelters. The Union has been put into thorough order.

NEW PYRITIC SMELTER.

In November, 1899, a pyritic smelter was started by the Boston and Colorado Smelting Company, which has been running continuously during the past year, except when increasing its plant. Starting with one furnace, it now has three, each of which can handle 200 tons of charge per day. The average percentage of fuel to the charge in these furnaces is $6\frac{1}{2}$. The fuel used is coke. The ore being charged as a raw sulphide, the burning sulphur replaces the excess of fuel used in the lead smelters. No roasting is required for the ores, as the product, when obtained, is in iron or copper matte. Very low-grade ores are treated in this smelter.

BISMUTH ORES.

As an interesting and comparatively new product from the Leadville mines may be mentioned the bismuth ores on Breece Hill. This ore seems to be a mixture of bismuth carbonate and oxide, or a bismuth ocher with the carbonate predominating. The values of the ore range from 2 to 40 per cent bismuth and from one-half ounce to 70 ounces in gold to the ton, but of the amounts shipped the average values are bismuth, 8 to 10 per cent, and gold, $1\frac{1}{2}$ ounces to the ton. The producing properties are the Ballard, Big Six, and Penn groups of mines.

All the output of these properties in this class of product has been

contracted for by an English metallurgical establishment for the next two years, the gold being paid for at its full value and the bismuth at the rate of \$15.50 for each unit.

The shipments during 1900 from the above-mentioned mines were as follows:

	Tons.
Ballard	140
Penn.....	70
Big Six.....	70
Total.....	280

THE MANGANESE PRODUCTION.

The manganese production of the district fell off during the year. The principal amounts of this ore have come from Fryer, Carbonate, and Rock hills, and seems to have formed a selvage to the large oxidized iron bodies in those hills. As the requirements of the steel works have called for an ore with a high percentage of manganese, the reserves of this grade have gradually been exhausted. The original requirements called for an ore of not less than 30 per cent, but finally an ore of 20 per cent was accepted. The principal shippers of manganese ore—the Catalpa-Crescent properties—shut down during June, 1900.

SAFETY AND ECONOMY.

Possibly the Ibex Mining Company is the most progressive in the district in providing safeguards and economies in mining. One of the devices installed during the year is an electric signal, with stations at each level. The system is simple and works admirably. Two lead-covered insulated copper wires are connected with two incandescent lamps at each station and in the hoisting room at surface; also with an electric signal bell at the hoist. Each station is furnished with a two-pole switch, and when the signal to hoist is given from any level all the lamps on the line as well as the hoisting room flash simultaneously and the bell rings at the hoist. Thus parties at any level know just where the cage is going by the number of flashes used in their signal code.

DATA AS TO EXPLOSIVES.

Most interesting data has been kept at this property regarding the effect of explosives for the period from May until December, 1900, covering a total distance run in that time by hand and machine drilling of 7,022 feet. The length of time taken and the distance run gives a very excellent basis for comparisons and largely eliminates accidental or abnormal conditions. The rock driven through was porphyry, limestone, and grits, and the work advanced by hand drilling, 2½-inch machine drills and 3-inch machine drills. Of the total distance of 7,022 feet driven, 2,298 feet were by hand drills, 3,714 feet by 2½-inch drills, and 1,009½ feet by 3-inch drills.

The powder (dynamite) used was 30 per cent nitroglycerin for hand drilling and 40 per cent nitroglycerin for the machine drills.

The average size of drifts, 7 feet 6 inches by 5 feet 6 inches outside of timbers, or 41¼ cubic feet of rock broken for every foot of advance.

The result of each method was as follows: Hand drilling, 1 pound of 30 per cent dynamite broke 23.8 cubic feet rock; 2½-inch machine,

1 pound of 40 per cent dynamite broke 7.5 cubic feet rock; 3-inch machine, 1 pound of 40 per cent dynamite broke 4.5 cubic feet rock.

AS TO HIGH EXPLOSIVES.

In considering the above results it may be well to mention that in using higher power explosives the terrible quickness of the explosion causes the energy produced to be largely expended in shattering the rock in the immediate vicinity of the hole instead of breaking it in large blocks. The larger the charge of powder used, within certain limits, increased this condition at the expense of effective work. As a result of these tests the management proposes to use a lower grade of powder for the machine work. The tests also show that machine work is wasteful in powder.

The details of cost per foot of drift by each method follow:

Items.	Hand drilling.	2½-inch machine.	3-inch machine.
Powder used per foot.....pounds..	1.73	5.45	9.01
Cost of labor per foot	\$3.16	\$1.86	\$3.99
Cost of powder per foot	\$0.216	\$0.737	\$1.320
Labor and explosive per foot.....	\$3.376	\$2.597	\$5.310

FINAL DEDUCTIONS.

These results show that: (1) Small 2½-inch machines break ground cheaper than hand drilling, although the consumption of explosives is three and one-half times that in hand drilling. (2) That drilling with the usual 3-inch machine drill is more expensive than hand drilling, but far quicker. Where the cost of operation is so great, as in the deep mining at Leadville, with the large amount of water to handle, the cost of pumping averages 10 cents a minute, or \$144 per day. Delay in running a drift has to bear its proportional part of the \$144 charged against it, hence in the long run machine drilling is cheaper than hand drilling.

LEASING AND ROYALTIES.

The great bulk of the ore extracted in the Leadville district is done through the leasing system, comparatively few owners of mines operating their own properties. The royalties paid are usually fixed on a sliding scale, according to the value of the ore, from 10 per cent to 50 per cent of the net smelter returns. Perhaps there is no other mining district in the State where lessees are willing to expend such large amounts of money in the installation of plants of machinery before any ore is extracted. A case in point is the "A. M. W." lease, where the leasing company has expended over \$100,000 in surface, plant, and pumps, in unwatering the mine, and enlarging the main working shaft to suit the increased hoisting plant.

RAILWAY SPURS.

A most important factor in the economic working of the mines during the year has been the extension of the different lines of railroad by spurs and switches over the camp, so that nearly every mine of importance is reached by a sidetrack. This means a saving of from

40 to 60 cents a ton on all ore shipped and an equal saving on coal and mine supplies.

LEAD-ZINC ORES.

The lead-zinc ores of the district have received a good deal of attention, the effort being to separate by concentration the zinc and iron from the lead, making a product which can be handled by the smelters, and then separating the iron sulphides as far as possible from the zinc sulphides, a product suitable to the zinc smelters. As the zinc product obtained has only found a market during the last two years, it is a comparatively new industry, as heretofore the zinc paid a penalty at the lead smelters.

The vast bodies of zinc-lead sulphides which exist in the lower workings of carbonate and iron hills will ultimately be worked for their zinc contents, as well as for the lead, but the present outlook is in the direction of treating this class of ores by some leaching process, which will extract the zinc and leave a residue which can be handled profitably by the lead smelters.

VALUE OF ZINC-ORE SHIPMENTS.

The amount of zinc ore shipped during the past year, nearly one-half going to smelting works in Europe, is estimated at about 111,000 tons, which brought about \$10 per ton, or a valuation of \$1,110,000.

LA PLATA COUNTY.

While the La Plata district is not a new one, having been known for more than twenty years, it is still in the prospective stage.

Aside from the tellurium veins little mining has been done, and not one of these veins has been mined as fairly as the production warranted, on account of the excessive royalties demanded. The output has been greatly curtailed by litigation affecting the richer tellurium properties, although nearly all of them have been patented.

From various avenues of information relative to production it must be apparent that the aggregate for the year has fallen short of any previous year. This may be explained in part by the fact that two of the larger companies which have acquired vast territory by patent have not operated during the year. Some work has been performed in the nature of investigation of ores and methods of treatment.

This county possesses a great variety of ores, but there exists certain general geological lines which simplify the situation for the operator.

THE MANCOS SECTION.

More thorough, perhaps, than in any other has work been performed in the Mancos section toward determining the character and values of the ores, and as a result a combination mill, employing cyanide, concentrative, and pyritic smelting, will be erected. Investigation of the lower-grade ore zones elsewhere in the district has resulted in similar determinations as to treatment, and it is definitely settled that the cyanide process is to play an important part in the greater production of the district.

The Needles district is more active than ever before. The district

has two systems of veins, both very large. One is matting ore and the other concentrating product.

The leasing system obtains to a limited extent.

MINERAL COUNTY.

The year's production shows a decrease from that of the preceding one, yet it has been one of the most prosperous in the history of the camp in the way of developments and the addition of new machinery in all the large properties. The camp is traversed by three great veins.

Large ore bodies have been opened up and blocked out for future extraction. The driving of tunnels penetrating a great distance and depth, for purposes of drainage and opening up of greater ore bodies, has been successfully carried forward.

Deep mining has evidenced increased values, particularly in gold. Many mines heretofore idle on account of water have recently been drained through these great drainage tunnels.

Most of the large producing mines are equipped with fine electric hoists and tramways, capable of handling 2,000 or more tons per day.

The ores are mostly sulphides carrying silver, lead, zinc, and some copper. There being no smelter here, the ore is all shipped for treatment.

THE NELSON TUNNEL.

The Nelson tunnel is the most important piece of development work in the county, and the benefits which the mines in its course have already derived by way of draining can not be overstated. The tunnel is making over 3,500 gallons of water per minute, and now drains all the mines tributary to it. It is in a distance of over 9,000 feet. In the early part of the year it had progressed sufficiently to tap the Chance and Amethyst mines, which was successfully done with diamond drills. As soon as the water was started it began washing a great opening of a size to drain the two mines, which held between 400 and 500 feet of water, inside of two hours. The tunnel has now reached the United mines ground, and from there will be driven to the Park Regent, 3,000 feet distant, cutting the vein 1,600 feet from the surface. In addition to driving the tunnel, a car tramway from its mouth to the railroad switch, half a mile, has been constructed. Electric motors will be put on to haul the cars of ore in and out of the tunnel.

It is conceded that this great tunnel enterprise will do more to develop the rich mineral resources of the great Bachelor Mountain vein than all similar ventures in the district combined. •

THE COMMODORE.

The Commodore has experienced an exceptional year in the way of improvements. In level No. 5, which starts from the creek level at the base of the mountain, the most gigantic improvements have been made. Expensive machinery has been installed where the company proposes sinking a shaft 1,000 feet. The excavating at this point consists, first, of an engine room, 12 by 25 feet, in the side of the tunnel; then south of this a wide drift was run 35 feet, at the end of which a large room, or station, 40 by 25 feet and 40 feet high, was excavated where the shaft is being sunk. This was started about 55 feet from the vein, and will be carried down on the same dip. The

reason for keeping near but off the vein is to obviate handling the large volume of water that would be encountered if sunk on the vein. The mine is supplied with large steam and electric plants, capable of developing 5,000 horsepower. About 400 men are employed on the mine.

OURAY COUNTY.

While there has been a falling off in tonnage of Ouray County during 1900, the returns show increased value over any previous year. New producers have come into prominence and the resumption of work in old claims has been noticeable.

The principal districts in the county are Mount Sneffles and Red Mountain.

MOUNT SNEFFLES DISTRICT.

In the Mount Sneffles district are some of the most noted mines in the county. These are located in what is known as the Ouray gold belt, in a particular zone extending for some miles through the so-called San Juan country. These mountains are crowned by a massive formation of andesitic breccia of varying depth. This rests upon upturned dikes of schist and quartzite, and the whole mass is traversed by numerous dikes of porphyry. It is in these quartzite or porphyritic dikes that the ore deposits are found. The ore is usually in the form of a brown oxide and then passes down into a low-grade sulphide, although this is not without exception, as in the Camp Bird group, thus giving a product of free-milling, concentrating, and smelting ores. The veins are great fissures throughout the district, and increase in value with depth.

FIVE CONCENTRATING PLANTS.

There are five concentrating mills in operation, having a daily capacity of 650 tons; and upon the completion of the new pyritic smelter, which has a capacity of 100 tons per day, the output will be greatly increased, as it will handle the low-grade refractory ores of the county.

RED MOUNTAIN DISTRICT.

In the Red Mountain district there has been a reopening of old claims. The ores are principally sulphides. The proposed developments for the ensuing year will require the services of 2,000 miners throughout the district. In this, as in the other districts, the values in the ore, as far as developed, remain permanent.

SYNDICATE OPERATIONS.

Much of the activity shown in this county is due to the acquisition by syndicates of immense acreage of mining property. They have installed heavy plants with all modern appliances to prospect and develop their claims, and satisfactory results have been obtained.

REVENUE TUNNEL.

The Revenue Tunnel Company is known to be one of the steadiest producers in the district. It embraces nearly 30 miles of workings, exceeding that of any other mine in the State. A depth of 3,000 feet

has been obtained, and fully establishes the continuity of the veins. The ores are sulphides, carrying gold, silver, and lead values, and are treated at the Revenue mill, which has a capacity of 100 tons per day.

The improvements to be found about this property are of the latest kind, and everything is added that can be suggested for the successful operation of the mine and mill. Electrical power is used throughout the immense workings, and about 600 men are employed.

THE FAMOUS CAMP BIRD.

The famous Camp Bird mine continues its output of gold ore. Many improvements have been made, at a cost of \$250,000. Besides increasing the capacity of the mill to 300 tons per day, there has been added a new cyanide plant, having a daily capacity of 200 tons, to handle the low-grade ore and the tailings from the amalgamating plates, embodying all the fundamental principles carefully worked out in every detail.

The ore, in coming from the mine, passes through a rock breaker and is then sent on the tram to the mill, 2 miles below, where it is received in ore bins having a capacity of 2,000 tons. From the storage bins it is passed over shaking screens, the fine going directly into the elevator and the coarse through the first set of rolls, then elevated to a set of revolving screens. There are two sets of these screens, so that if anything goes wrong with one the other can be immediately put into use.

From the screen the ore passes to a set of jigs which automatically separate the minerals from the gangue. All the gangue and tailings from the various jigs are gathered and the water separated from them, when the material passes to a third set of rolls for finer grinding. From these rolls the finely crushed material passes through hydraulic sizers, which classify the ore; then to the Wilfley tables, separating again the mineral from the gangue, and the latter is passed through another set of rolls, reducing it still finer, and this, in turn, over additional tables.

AMALGAMATING PLATES.

From the batteries the ore is passed over amalgamating plates, which separate and save the principal values. The residue and slimes are then conveyed into six large cyanide tanks of 600 tons capacity each. When the tanks are full the product is treated with solution for six days. The entire process is as automatic as possible from the time the ore enters the mill until discharged from the cyanide tanks.

A MODEL MILL.

The mill is in every respect modern, complete, and convenient. Different portions of the mill will be operated from dynamos so placed as to economize in the shafting and belting. The mill is located at the confluence of the Imogene and Sneffles Creek, at a place called Potosi, about 6 miles from Ouray. The motive power is electricity, derived mostly from the Telluride Transmission Company's plant at Ames, some 18 miles distant. There are 260 men employed.

MELDRUM TUNNEL.

The early resumption of the Meldrum tunnel will materially add to the output. This enterprise was started two years ago. It will cut

through the main range and open up a better means of transportation for the great producing mines in what is called the San Juan country. The bore will be 4 miles long and large enough to allow the passage of a narrow-gauge train.

PITKIN COUNTY.

During the year 1900 the mining interests of Pitkin County have not advanced in a very marked degree. Very little development work or prospecting for new bodies of ore has been undertaken, and the work, with the exception of one large company, was generally carried on by lessees. Under the leasing system very little development is done in this district, the operator electing to prospect old workings and extract scattered ore left by former management.

Another and more serious drawback to active work in the Aspen district is the fact that the high-grade deposits of silver, which were phenomenal in the early days of the camp, have gradually disappeared with deeper workings, until the present ores are uniformly of low grade, and, unless the operator can afford to erect a concentrator, where the ore will allow it, he is forced to confine his attention to those grades which can still, by careful sorting, be converted into a shipping product. Very few of the districts of the State have suffered to the same extent from the decline in silver as the Aspen district, as its product was and is so largely a silver ore with no associated gold.

THE PRODUCING AREA.

The producing properties are confined almost exclusively to the mines on Aspen and Smuggler mountains, which contain the great ore-bearing contact between the blue and brown limestones with its numerous fault lines that are frequently mineralized. During the more prosperous days of the camp several long tunnel enterprises were organized, and tunnels driven to the contact at different points on both mountains. Of late years these tunnels have been the outlets for the product of nearly all the large properties, effecting material saving in hoisting of ore and in unwatering a great scope of territory which could not possibly be worked at a profit with the lower grade of ore if the expense of maintaining large pumping and hoisting plants had to be included in the cost of mining.

VARIABLE ORE CHUTES.

While it has been settled beyond question that the same great contact extends across the two mountains and entirely under the town of Aspen, yet the values are distributed in well-defined ore chutes, or deposits, and almost all of these chutes vary in character. In one the value will be found associated almost entirely as the baryto, or heavy spar, with the lime. In another the baryto will have a varying percentage of lead in the form of sulphide, often sufficient to be profitably treated by concentration. Other ore bodies have a very good grade of lead, frequently reaching as high as 30 per cent as it is mined. In instances like the last mentioned the lead becomes the valuable metal, as it generally brings from two to three times as much money value as the silver contents contained. In still other ore bodies a very large percentage of zinc is met, frequently carrying as much as 40 per cent, but as it is in every case very finely disseminated and associated

with iron, from which it seems thus far almost impossible to effect a perfect mechanical separation, the zinc is a detriment, and where treated in connection with the lead ores is allowed to go to waste or is impounded in storage ponds in the hope that the time may come when it can be handled commercially.

Aspen Mountain contains a great group of formerly famous producers, such as the Durant, Argentum-Juniata, Aspen, Emma, Vallejo, Spar, Enterprise, Bonny Belle, and others. These are worked through the Durant tunnel, the Veteran tunnel, and the Castle Creek tunnel.

SMUGGLER MOUNTAIN.

On Smuggler Mountain the Cowenhoven tunnel taps the workings of the Della I, Bushwacker, Mineral Farm, Regent, and Homestead mines. While run in from as low a point on Smuggler Mountain as was convenient still, in the case of the Regent, the tunnel cuts this property above the workings of the mine, and a winze has been sunk from the tunnel level to the ore bodies on the contact and a station cut which is furnished with an electric-hoisting plant and all ore raised to the level of the tunnel. The reverse of this is the case with a very large number of the properties cut on both mountains, the tunnels coming under the workings and upraises being made to the ore bodies, through which the ore is lowered to the tunnel level below.

In addition to the properties mentioned above, on Smuggler Mountain are the Mollie Gibson and Smuggler mines, both of which handle their ore through their own shafts.

The Mollie Gibson lying on one side of the town of Aspen, and the Argentum-Juniata on the other, on different mountains, with the large stream of the Roaring Fork between, are still connected by underground workings, which have been pushed on the line of the line contact, conclusively showing that the contact extends entirely under the town. These mines are connected by an underground electric railway.

DEEP WORKINGS.

The deepest workings in this district are in the Gibson, which has a shaft 1,200 feet in depth, but has been flooded for several years past. In order to keep the working levels dry, the Mollie Gibson has a very fine pump of the Snow pattern, triple expansion, duplex, condensing, and steam jacketed, which pumps 1,800 gallons a minute, raising the water 1,000 feet to surface. This also drains the Argentum-Juniata.

CONCENTRATING MILLS.

A number of concentrating mills have been built, several of which are on the Roaring Fork, right at the town. Perhaps the best example of the work done is at the two Smuggler mills, the old mill having a capacity of 150 tons in a day of ten hours, and the new mill, on the opposite side of the creek, 125 tons. Neither of these mills work a night shift.

The Smuggler ore consists of a limestone carrying from 4 to 5 per cent galena, 10 to 15 per cent zinc carbonate, and an uncertain percentage of barium sulphate, with a small amount of silica, and about 4 to 6 ounces of silver per ton. At the old mill the ore is delivered in the upper part, where it is passed through a jaw crusher and rolls,

and sized by means of revolving screens, the different sizes passing to a number of Hartz jigs made in Germany specially for this mill. The middlings from the jigs are all conveyed to Bradley pulverizers and ground so that the coarsest material passes through a 60-mesh screen. From these pulverizers the pulp is run to a series of large V-shaped classifiers, from which the different sizes are taken to Hallett concentrating tables, which are simply modifications of the Wilfley table, and there the ore, practically in the condition of slimes, is very successfully separated into a galena and baryto sulphate as the headings, while the zinc carbonate with the iron are saved as middlings for future treatment, and the lime with some zinc and silica rejected as waste.

SMUGGLER NEW MILL.

At the Smuggler new mill the same separations are made, but only the Hallett tables are used. The ore being crushed to the size of grains of corn, is pulverized in Bradley mills, so that the coarsest will pass through a 60-mesh screen. These Bradley mills are modifications of Chilean mills, but on the Smuggler ore, which pulverizes very readily, their capacity is 60 tons a day for each machine.

THE HALLETT TABLE.

The Hallett table used in these mills is the invention of Mr. S. I. Hallett, who is the general manager of the Smuggler properties, and has been modified until, to all intents, it is simply a Wilfley table with the riffles set diagonally on the tables instead of longitudinally. The driving mechanism is the old quick-return movement formerly used on the King-Darrah table, the patent for which is now controlled by the Hallett Company. It is claimed for this table that the values being carried up to its cleaning side, the entire length, less wash water is required and, consequently, less dilution of the pulp is made on the table and less fine values are carried over into the tailings trough. The concentrates are carried off about midway on the end of the table instead of at the upper corner-side, as in the Wilfley.

At the new mill of the Smuggler Company two sets of tables are used, one set following the other, the second set treating the middlings from the upper or first set. The middlings from the four of the first tables are treated on one table in the second set. The barium sulphate in this ore contains so much silver that no attempt is made to keep the galena and heavy spar separate, although the smelters charge quite a heavy penalty for over 5 per cent.

The Mollie Gibson has a mill in which practically the same operations are carried on except that Frue Vanners are used in place of the Hallett tables. The ores capable of concentration from the Mollie Gibson and Argentum-Juniata are worked conjointly in this mill.

TEST MILL FOR DELLA S. ORE.

Another mill, farther up the Roaring Fork, which was remodeled from a lixiviation plant into a concentration mill, is now being used as a test mill on the Della S. ore. The ore here is pulverized by stamps so as to pass a 40-mesh screen, and the pulp then sized by an upward current of water against a descending stream of pulp. The heavier sizes are conveyed to Wilfley tables and the slimes to V-shaped boxes, where the settled pulp is treated on Frue Vanners. A claim

is made that the combination of these two systems—the Wilfley table for the coarse sand and the Frue Vanner for the slimes—effect a saving of 70 per cent of the values.

TWO SAMPLERS.

Two sampling works are kept busy in the town and handle practically all the ore mined before it is sent to the smelter. All the mills, including the sampling works, are run by electric power generated by the Castle Creek Power Company, which also furnishes the illumination for the town. A large quantity of limestone was furnished during the early part of the year to the smelters, which paid for the lime and also for the silver contents, which, while low, returned a profit. This was made possible as the limestone was shipped from the old dumps without sorting.

ECONOMIC IMPROVEMENTS.

The only economic improvements during the past year in the camp is the extending of a railroad spur up Castle Creek to the Castle Creek tunnel and a branch up the side of Aspen Mountain for a short distance, which will reduce the cost of hauling and tramming ores.

The outlying districts have been practically idle during the year, and the Independence district, of which much was hoped as a gold-producing section, has not realized the expectations of its supporters.

SAGUACHE COUNTY.

This county is divided into three mining districts. In the Bonanza district, located in the northern part of the county, a revival of industry is exhibited. The veins are large, carrying low-grade values in gold, silver, zinc, lead, and copper.

During the year two concentrating mills, each having a capacity of 50 tons per day, have been erected and successfully operated. The two drawbacks to the rapid advancement of the district are lack of capital and railway facilities.

CRESTONE DISTRICT.

In the southeastern part of the county is located the Crestone mining district. The old Baca grant, in litigation for a quarter of a century, has passed to a wealthy syndicate, which immediately prepared to develop its mineral resources.

A large stamp mill was constructed and equipped with the latest appliances. Its daily capacity is 300 tons, but only 50 are now being treated. The formation of the district is gneiss, schist, and granite. The ore bodies are large, and as depth is obtained the character changes from free-milling to a sulphide carrying considerable copper. Other mills are contemplated, and a railroad is now being constructed into the district.

EMBARGO DISTRICT.

In the Embargo district, in the southwestern part of the county, considerable work has been done on old claims. The ores are heavy in iron sulphides and suitable for treatment at the matting smelter that will be erected the coming year.

SAN JUAN COUNTY.

The mining industry of this county shows a steady increase over previous years. Many improvements have been inaugurated, discoveries made, and new enterprises launched. The trend seems to be in consolidation of individual interests, and this is making a wonderful change in the development of the district. Experience has demonstrated that the only way to work the low-grade mines is with large areas and aggregation of capital.

FISSURE VEINS.

The mines are what are generally termed "fissures," varying from 1 to 100 feet in width, and can be traced for several miles. The mines are nearly all equipped with reduction mills, tramways, electric and compressed-air drills.

The county is divided into three mining districts, namely, the Animas, Eureka, and Red Mountain, ranking in production in the order named. The ores are all heavy sulphides, carrying values in gold, silver, lead, and copper, embodying for treatment both concentration and pyritic smelting.

In concentrating it is the usual custom to put four tons into one, giving an average value of \$48 per ton. The values through the county are gradually increasing as depth is attained, sulphide ore predominating. No considerable leasing obtains in the county.

There are in active operation 12 concentrating mills, having a total capacity of 1,190 tons per day, besides that of the pyritic smelter.

The average number of men employed in the mines and mills is estimated at 1,600.

NEW PYRITIC SMELTER.

One of the most valuable improvements inaugurated is the Kendrick-Gilder pyritic smelter. This will enable quite a number of mines to ship ore that has heretofore been of too low a grade for profits. A great saving has been made in the cost of treatment by installing the Bretherton hot-blast matte settling attachment, which has already proved its value by reducing the amount of coke and lime used about 50 to 60 per cent, making a much cleaner matte and slag than is possible by the old process, as, by using less coke, more sulphur is consumed, allowing the liberated iron to enter the slag as a flux. The blast is passed on its way to the blast furnace from an ordinary blower through a large rectangular steel box filled with tubes placed over the immense slag receiver and matte settling iron box, which is kept in a liquid condition by being inclosed and a few pieces of charcoal thrown on the top of it. It is the radiated heat from this settler which heats the blast up to about 400 degrees. By this system of treatment the low values of copper contained in most of the ores are saved which, under the ordinary wet concentration methods, were lost.

SILVER LAKE MINES.

The Silver Lake mines comprise probably the largest group of claims in the State, covering an area of more than 1,200 acres, the output averaging about 200 tons per day.

The tramway from these mines to the mill has recently been reconstructed, spanning 6,000 feet.

A new and commodious boarding house, capable of accommodating 300 people, has been erected during the year.

The owners of this immense property were the first in this State to use electric drills in their mines, thereby greatly reducing the cost of development. A 250-horsepower Westinghouse engine has been recently installed. It will supply the power for the mill, the 1,600-light dynamos, and the 80-horsepower Rand air compressor, by which the machine drills are driven, and transmit the light and power to other properties of this company, 2 miles distant.

A long tunnel is being driven 6,500 feet to intersect the Gold King claim at a depth of 2,000 feet below the surface.

THE SUNNYSIDE.

The Sunnyside mine has worked a greatly increased force. It has two mills in active operation, but owing to scarcity of water the upper one was not run continuously. Their combined capacity is 150 tons per day. The wire tramway connecting mines and mill has a daily carrying capacity of 100 tons.

GOLD KING.

The Gold King Consolidated Mines Company have greatly increased their milling capacity and are now able to handle 400 tons per day.

They have expended during the year about \$100,000 in improving the mill and building a new tramway. The mines have immense bodies of free-milling ore. The veins are fissure, and the main vein of the Gold King is, in the present workings, about 48 feet wide and can be traced for over 2 miles.

The present output is about 250 tons per day. A tunnel 8 by 8 feet is being run from the mill to the mines, which will be, when completed, 1,700 feet long, and through which all ores will be transferred directly to the mill.

SAN MIGUEL COUNTY.

While the valuation of the year's output will hardly exceed that of 1899, yet the mining industry in this county has witnessed material advancement. The failure to increase production can be attributed to several good incidents, among them being that of litigation interfering with many producers, while in others considerable time has been given to development and enlargement of treatment capacity. The larger properties have added to their ore reserves and the smaller have been steadily forging to the front.

There is a great variety of mineral formation in the district. While the general formation is true fissure veins, yet there are large bodies of ore found in contacts and blow-outs.

OPHIR DISTRICT.

In the Ophir mining district, situated on either side of the San Miguel River, the formation is as nearly perfect as can be found anywhere. The veins run up the hill and are so located that by running long tunnels thereon great depth is gained. The ore streaks vary in

width, but the values seem quite uniform. Development shows that by depth the veins are strong and continuous. The surface croppings of the veins are usually rich in gold quartz; hence the name adopted for the district by the pioneers was "Ophir," meaning the land of gold.

The Globe-Suffolk Mining Company's property is one of the most extensively developed and perhaps the best equipped in the district, but owing to litigation it has not produced largely. It has installed a new 40-stamp mill with the latest improved amalgamating appliances and two Frue vanners for concentration.

BUTTERFLY-TERRIBLE GROUP.

The Butterfly-Terrible group has made rapid strides during the year. It is an old property which was worked in a desultory manner, but under new ownership and management development work has been actively carried forward. A new 30-stamp mill has been recently erected, containing Frue vanners and concentrating appliances of latest designs.

A tramway has been built connecting the mines and mill. The veins extend into the mountain, so that as drifts are extended depth is rapidly gained. The main opening is a tunnel on the Butterfly vein, which has reached a depth of 2,500 feet. The ore bodies are large and continuous, sulphide in nature, and carrying values in gold, silver, and lead.

TOM BOY.

The Tom Boy Gold Mines Company has accomplished about 4,000 feet of development during the year. The shaft is equipped with a double drum-hoisting plant capable of hoisting 500 tons per day. The machinery is driven by compressed air and electric power, supplied by Telluride Power Transmission Company.

The mill, with a capacity of 200 tons per day, is situated at the mouth of the tunnel on the 600-foot level. The ore as it comes from the mine is dumped into the bins, passing thence through three crushers and two sets of rolls. From here it passes through automatic feeders into eight Huntington mills, thence to the amalgamating plates. From the plates the pulp is treated by Frue vanners, any values remaining being concentrated in this process. The ore is practically free-milling, and the mine produced the past year 73,741 tons.

THE LIBERTY BELL.

The Liberty Bell Gold Mining Company has put into operation a milling process of cyaniding the ore that is unlike any other process now in operation in the State. The cyanide process is what is known as the South African method of direct treatment. As the ore leaves the mine it is fed into the crushers and then loaded into the tramway buckets automatically and conveyed to the mill, some 2 miles away. It is transported at a cost of about 20 cents per ton.

THE MILLING.

At the mill the ore is discharged into bins, and from here into automatic feeders to the batteries. From the batteries the ore passes over amalgamating plates by the ordinary stamp-mill process, and then to the Wilfley concentrating tables. From the concentrators the tailings

pass into the cyaniding department. This method is designed to save the refractory values that usually escape. The tailings from the Wilfley tables are received into tanks 33 feet in diameter and 8 feet deep, with a capacity of 300 tons.

AN INGENIOUS DEVICE.

They are deposited in the tank through an ingenious device made up of a series of pipes of varying lengths turned at the end so that the force of the discharge revolves the contrivance, thereby distributing the tailings all over the tanks and at the same time keeping the mass in a constant state of agitation. By means of openings near the top of the tank the slimes are permitted to escape, while the coarser product settles. When the tank is filled the discharge from the concentrators is turned to another tank, which is filled in the same manner.

The accumulation of the first tank is then drained and given a weak cyanide solution and subjected to a short treatment. Underneath these tanks is another set of the same dimensions. In the bottom of each upper tank are four discharge openings through which the material is shoveled, where it is again subjected to a strong solution of cyanide.

Before the mass leaves the upper tank all solutions are conveyed to four zinc precipitation boxes, each 21 feet long, $2\frac{1}{2}$ feet wide, and 2 feet deep. In these boxes the values are precipitated and the solution drained into sump tanks and used over again. After final treatment the tailings are discharged from the lower vats by sluicing through the openings in the bottom. It is estimated that the cost of treatment by this process can be brought below 75 cents per ton.

TELLURIDE POWER TRANSMISSION COMPANY.

For the growth of its mining industry San Miguel County is indebted to the Telluride Power Transmission Company more than to any other agency. The first plant was erected at Ames, at the confluence of two forks of the San Miguel River, about 12 miles distant, and having a combined capacity of 1,600 horsepower.

During the past season an enlargement of its plant to double its former capacity has been completed.

The new station is located about halfway between Telluride and Ames.

The water for driving the dynamo is taken from the discharge flume from the Ames plant, aggregating 3,000 cubic feet per minute. From the pressure box to the water wheels the water is conveyed by pipe of heavy boiler steel, 32 inches in diameter, under a head of 503 feet.

The whole apparatus is of the most modern type. In transmitting the power generated at this plant nearly 60 miles of aluminum cable are used.

NEW DISCOVERIES.

During the year there have been made a few new discoveries of ore deposited, carrying a fair percentage of copper, in the western end of the county, close to the Utah line, and extending north into Montrose County. But the long distance the ore requires to be hauled by wagons to railroad has greatly retarded development work.

From tests made it has been demonstrated that the lixiviation proc-

ess is best adapted for treating the ores, and one plant was erected the past year.

While it can not be said that the copper production in the La Sal Mountains has assumed any real importance, it is evident that the possibilities are at least promising.

TOTAL PRODUCTION.

County.	Gold (value).	Silver (coining value).	Total value, gold and silver.	Lead (value).	Copper (value).	Total value.
Baca.....		\$93	\$93		\$1,383	\$1,476
Boulder.....	\$595,099	116,534	711,633	\$3,146	3,162	717,941
Clear Creek.....	466,193	1,737,261	2,203,454	204,113	38,031	2,445,598
Chaffee.....	134,473	95,409	229,882	34,437	97,478	361,797
Costilla.....	1,240	147	1,387	83	15	1,485
Conejos.....	765	534	1,299		698	1,997
Custer.....	20,423	106,715	126,138	29,333	343	155,814
Delta.....	765	34	799			799
Dolores.....	39,010	203,888	242,898	7,866	5,555	256,319
Eagle.....	101,565	300,355	401,920	152,194	55,951	610,065
Fremont.....	41	257	298	135	1,034	1,467
Garfield.....	313	3	316			316
Gilpin.....	1,637,921	302,529	1,940,450	30,178	124,593	2,095,221
Grand.....	41	1	42			42
Gunnison.....	82,211	187,795	270,006	65,483	6,660	342,149
Hinsdale.....	55,355	198,987	254,342	387,436	4,538	646,316
Jefferson.....	78	1	79			79
Lake.....	2,687,612	9,686,044	12,373,656	2,571,583	611,755	15,556,994
Larimer.....	1,078	47	1,125		2,148	3,273
La Plata.....	10,675	8,751	19,426	579	55	20,060
Montrose.....	593	17,854	18,447		4,949	23,396
Mesa.....	20		20		320	340
Montezuma.....	1,391	2	1,393			1,393
Mineral.....	201,471	2,918,590	3,120,061	618,393	2	3,738,456
Ouray.....	1,434,692	2,540,664	3,975,356	392,024	54,891	4,422,271
Park.....	114,255	48,806	163,061	28,213	2,332	193,606
Pitkin.....	1,054	5,271,491	5,272,545	1,135,388	871	6,408,804
Pueblo.....	103	11	114			114
Rio Grande.....	105,521	3,933	109,454	1,076	1,295	111,825
Routt.....	1,213	49	1,262		899	2,161
Saguache.....	7,782	20,208	27,990	13,059	2,485	43,534
San Juan.....	752,325	871,923	1,624,248	727,047	307,333	2,658,628
San Juan region.....	1,550	32,562	34,112	2,358	35,966	72,436
San Miguel.....	1,810,695	1,451,691	3,265,386	138,693	48,477	3,452,556
Summit.....	331,535	516,169	847,704	232,051	8,242	1,087,997
Teller.....	18,073,539	102,515	18,176,054		5	18,176,059
Wild.....	83		83			83
Unknown.....	196,712	255,075	451,787	13,364	122,354	587,505
Total.....	28,869,392	26,998,928	55,868,320	6,788,232	1,543,820	64,200,372

SOURCE OF PRODUCTION.

Gold:

Placer bullion.....	\$721,734
From chlorination mills.....	5,844,607
From cyanide mills.....	2,521,259
From dry and copper ores.....	15,034,162
From lead or wet ores.....	4,747,630
Total.....	28,869,392

Silver (coining value):

From quartz.....	6,209,753
From lead and copper ores.....	20,789,175
Total.....	26,998,928

IDAHO.

By J. W. CUNNINGHAM,

Assayer in charge United States assay office at Boise, Idaho.

Idaho's production of the metals during the year 1900 was as follows:

Gold	\$2, 078, 036
Silver	8, 468, 839
Lead	7, 689, 974
Total	18, 236, 849

A comparison with corresponding values for the previous year shows a falling off in gold of \$32,682, an increase in silver of \$3,185,396, and an increase in lead of \$2,976,370; a net gain of \$6,129,084.

The decrease in gold is accounted for by the falling off of the water supply in the placers, caused by the light snowfall in the mountains. The increase in silver and lead comes mainly from the Coeur d'Alene mines, of Shoshone County, where all of the mines have materially increased their output.

The following tables have been carefully compiled from the most reliable sources—in most cases direct from the mine owners—and it is thought they will be found without error or exaggeration:

PRODUCT OF GOLD AND SILVER IN IDAHO, BY COUNTIES, CALENDAR YEAR 1900.

County.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Value.	
	<i>Fine ozs.</i>		<i>Fine ozs.</i>		
Ada	1, 621	\$33, 509	656	\$848	\$34, 357
Bannock	533	11, 018	186	241	11, 259
Bingham	881	18, 212	59	76	18, 288
Blaine	1, 666	34, 439	157, 548	203, 698	238, 137
Boise	17, 835	368, 682	5, 068	6, 553	375, 235
Canyon	465	9, 612	105	136	9, 748
Cassia	1, 935	40, 000	185	239	40, 239
Custer	2, 070	42, 791	111, 878	144, 650	187, 441
Elmore	3, 730	77, 106	1, 418	1, 833	78, 939
Idaho	7, 354	152, 021	1, 856	2, 400	154, 421
Lemhi	15, 855	327, 752	3, 008	3, 889	331, 641
Lincoln	2, 108	43, 576	289	374	43, 950
Oneida	629	13, 003	99	128	13, 131
Owyhee	37, 538	775, 979	1, 006, 212	1, 300, 961	2, 076, 940
Shoshone	5, 754	118, 946	5, 261, 417	6, 802, 640	6, 921, 586
Washington	551	11, 390	134	173	11, 563
Total	100, 525	2, 078, 036	6, 550, 118	8, 468, 839	10, 546, 875

Metal.	Quantity.	Value.
Gold	100, 525 fine ounces..	\$2, 078, 036
Silver	6, 550, 118 do.....	8, 468, 839
Lead	170, 888, 315 pounds..	7, 689, 974
Total value		18, 236, 849

GOLD AND SILVER PRODUCED IN IDAHO DEPOSITED AT GOVERNMENT INSTITUTIONS DURING THE CALENDAR YEAR 1900.

Mints and assay offices.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Value.	
Mints:					
San Francisco	470.896	\$8,760.85	128.34	\$149.34	\$8,910.19
Philadelphia	456.005	8,483.81	156.16	181.71	8,665.52
Denver	514.949	9,580.45	51.01	59.35	9,639.80
Assay offices:					
Boise	40,857.824	760,145.56	11,546.39	13,435.80	773,581.36
Helena	11,069.125	205,937.21	2,181.76	2,538.77	208,475.98
New York	95.396	1,774.81	21.45	24.96	1,799.77
Seattle	292.795	5,447.35	42.71	49.70	5,497.05
Total	53,756.990	1,000,130.04	14,127.82	16,439.63	1,016,569.67

SOURCE OF THE DEPOSITS AT THE UNITED STATES ASSAY OFFICE, BOISE, IDAHO, FOR THE CALENDAR YEAR 1900.

Source.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Value.	
Idaho:	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Ada County	918.619	\$18,989.54	415.99	\$537.85	\$19,527.39
Bannock County	322.331	6,663.18	135.58	175.29	6,838.47
Bingham County	716.574	14,812.90	44.86	58.00	14,870.90
Blaine County	907.775	18,765.37	455.25	588.60	19,353.97
Boise County	13,821.039	285,706.23	4,089.40	5,287.31	290,993.54
Canyon County	246.078	5,086.88	62.31	80.56	5,167.44
Cassie County	1,160.001	23,979.36	99.36	128.47	24,107.83
Custer County	550.769	11,385.41	238.46	308.31	11,693.72
Elmore County	3,049.435	63,037.42	1,116.91	1,444.08	64,481.50
Idaho County	4,188.261	86,579.03	994.34	1,285.61	87,864.64
Lemhi County	5,785.724	119,622.20	833.66	1,077.87	120,700.07
Lincoln County	1,395.383	28,845.12	219.19	283.40	29,128.52
Oneida County	377.635	7,806.41	54.67	70.68	7,877.09
Owyhee County	2,138.079	44,198.02	1,212.17	1,567.24	45,765.26
Shoshone County	891.896	18,437.12	338.57	437.75	18,874.87
Washington County	301.442	6,231.36	81.03	104.77	6,336.13
Total, Idaho	36,772.041	760,145.55	10,391.75	13,435.79	773,581.34
Alaska	58.308	1,205.33	7.53	9.74	1,215.07
Montana	6,052.766	125,121.78	485.23	627.37	125,749.15
Oregon	34,455.910	712,266.87	14,347.19	18,549.90	730,816.77
Utah	304.072	6,285.73	76.71	99.18	6,384.91
Washington	173.983	3,596.55	39.94	51.64	3,648.19
British Columbia	33.160	685.48	8.88	11.48	696.96
Northwest Territory	9.119	188.50	4.10	5.30	193.80
Redeposits	2,650.788	54,796.65	563.71	728.84	55,525.49
Grand total	80,510.147	1,664,292.44	25,925.04	33,519.24	1,697,811.68

DISTRIBUTION OF THE GOLD AND SILVER PRODUCT OF IDAHO FOR THE CALENDAR YEAR 1900, AS TO SOURCES OF PRODUCTION.

Gold:	Fine ounces.
Quartz	56,804
Placer	43,721
Silver:	
Quartz	1,021,153
Lead ores	5,528,965

MONTANA.

By B. H. TATAM,

Assayer in Charge United States Assay Office, Helena, Mont.

The value of the gold, silver, copper, and lead recovered from mining during the calendar year 1900 aggregated \$63,746,726.91 in value, and was distributed to the several metals in the following quantities and amounts:

Description.	Quantity.	Value.
Gold.....fine ounces..	229,114.882	\$4,736,224.95
Silver.....do.....	14,294,835.11	^a 18,482,211.05
Copper (at \$16.19 per hundredweight).....fine pounds..	245,998,365	39,827,135.29
Lead (at \$4.37 per hundredweight).....do.....	16,044,751	701,155.62
Total value.....		63,746,726.91

^a Coining value.

The prices at which both copper and lead are figured above were the average New York selling prices for these metals. When compared with the production in the year 1899 a slight decrease is to be noted in each of the metals, the difference being shown in the table below:

Metals.	1899.		1900.		Decrease.
	Quantity.	Value.	Quantity.	Value.	
Gold.....fine ounces..	233,126.717	\$4,819,156.95	229,114.882	\$4,736,224.95	\$82,932.00
Silver.....do.....	16,850,754.85	^a 21,786,834.52	14,294,835.11	^a 18,482,211.05	3,304,623.47
Copper.....fine pounds..	245,602,314	40,941,905.74	245,998,365	39,827,135.29	1,114,770.45
Lead.....do.....	20,344,750	909,410.33	16,044,751	701,155.62	208,254.71
Total.....		68,457,307.54		63,746,726.91	4,710,580.63

^a Coining value.

The total decrease in the values is equal to 7 per cent. Nearly all of this amount occurred in silver. This was due to the closing down of the works and mines at Elkhorn, to the steadily diminishing output of silver-lead ores in the State, to smaller silver contents in the copper ores of the Butte district, and to a lessening output of silver by the mills of the State. The exhaustion of ore at several of the mines heretofore prominent as large producers explains the decrease in gold. In copper the loss in value was due to a lower average price for this metal during 1900 than in 1899, the quantity of copper having increased somewhat.

Lead mining in Montana is at present of minor importance. In 1900 the mining of this metal in Beaverhead, Broadwater, Cascade, Flathead, and Meagher counties showed either no improvement or a decrease from the operations of the preceding year.

Notwithstanding the decreases noted above, the mining industry in the State is in a flourishing condition, and the promise for the future is fully as encouraging as at the close of the preceding year. However, the eight-hour law was a feature of the political campaign in

1900, and, having been a successful issue at the polls, an uncertainty characterizes mining operations. Until the contemplated legislation is enacted and its operation tried, the advancement of the mining industry must at least be hindered temporarily. This embarrassment, however, is no reflection on the real merit of the natural abilities of the properties themselves when not interfered with.

The gold that was won in 1899 and 1900 originated from the sources indicated in the table below, and in the quantities and values specified:

Classification.	1899.		1900.		Increase.	Decrease.
	Quantity.	Value.	Quantity.	Value.		
	<i>Fine ounces.</i>		<i>Fine ounces.</i>			
Placer bullion	28,827.617	\$595,919.73	26,709.214	\$552,128.45	-----	\$43,791.28
Mill bullion	64,070.159	1,324,447.73	70,350.342	1,454,270.64	\$129,822.91	-----
Cyanides	38,247.583	790,647.71	42,923.697	887,311.57	96,663.86	-----
From copper ores ..	55,706.317	1,151,551.77	54,252.098	1,121,490.40	-----	30,061.37
From lead ores	7,815.539	161,561.53	7,918.654	163,693.10	2,131.57	-----
In smelting ores	38,459.502	795,028.48	26,960.877	557,330.79	-----	237,697.69
Total	233,126.717	4,819,156.95	229,114.882	4,736,224.95	228,618.34	311,550.34

The gold taken from the placers of Montana amounted to 11.66 per cent of the total production, having been the result of operations more or less extensive in the several parts of the State where mining prevailed. There are extensive deposits of auriferous gravel upon which large operations are contemplated, but these can only be brought to profitable operation by the expenditure of considerable sums of money under intelligent and efficient direction for ditches, flumes, drains, and machinery. The gain in mill bullion during 1900 came from the development of a class of ores in the State suited to such operations and the equipment of the same with the necessary facilities for the treatment of this class of the product and the saving of the contained values.

The gain of nearly \$100,000 from material treated at the several cyaniding plants in the State indicate that this process can be operated successfully on the ores of the State and that its employment is attended with profitable results. Its use is under consideration at properties where it has not heretofore been employed, and the coming year will probably witness the establishment of additional works for the savings of values. The gold taken from the copper ores of the State in 1900 shows practically no change, the amount of gold per ton in the ores reduced having been about the same during each of these years. From lead ores the gold produced varied little in 1900 from the yield of 1899, and the falling off in the amount taken at the smelters from dry ores and concentrates was principally due to the smaller output of these ores throughout the State.

The amounts of silver for the years 1899 and 1900 that originated in the various classes of the product were as follows:

Classification.	1899.		1900.		Increase.	Decrease.
	Quantity.	Value.	Quantity.	Value.		
	<i>Fine ounces.</i>		<i>Fine ounces.</i>			
Placer bullion	8,592.78	\$4,645.20	3,252.20	\$4,204.86	-----	\$440.74
Mill bullion	2,690,892.07	3,479,133.17	1,766,692.59	2,284,208.60	-----	1,194,924.57
Cyanides	97,684.83	126,299.58	109,452.38	141,514.58	\$15,215.00	-----
From copper ores ..	9,890,572.37	12,787,810.73	9,324,085.36	12,055,383.13	-----	732,427.60
From lead ores	2,504,695.24	3,238,393.85	2,134,802.18	2,760,148.27	-----	478,245.58
From smelting ores	1,663,317.56	2,150,551.99	956,550.07	1,236,751.61	-----	913,800.38
Total	16,850,754.85	21,786,834.52	14,294,835.11	18,482,211.05	15,215.00	3,319,838.87

The silver obtained from the placer mines of the State is insignificant, this metal being associated with the gold as a by-product. The gain in silver recovered at the cyanide plants in the State is to be attributed to the same causes attendant upon the gain in gold from this source. Decreases in the silver production of 1900 below that of 1899 occurred in the mill product, in the ores sent to the smelters, and in that taken as a by-product from copper and from lead ores. The abandonment of the Elkhorn mine, already noted, partially explains the falling off of the silver from milling plants. Besides this the amounts taken from the ores of the Philipsburg district was decreased. The output of silver in Doré bullion by the Montana Mining Company, at Marysville, and from other mills in the State also shows a lessened output during 1900. A decrease in the silver won from the smelting of copper and lead ores was due either to a decreased output of the ores themselves or to a smaller amount of the silver contents per ton of ore mined and treated.

The mining of the copper ores in the State is still the most important and valuable feature of the metal-mining industry. The city of Butte, the center of this production, continues to be the scene of great commercial and industrial activity. Its production of that metal is the greatest of any region in the world, more than one-fourth of the world's supply of copper coming therefrom. The previous large number of employees under ground at Butte and in the smelters at Butte, Anaconda, and Great Falls was maintained steadily throughout the year, while the tonnages of the railroads in coal and incoming supplies and in copper matte and ores outgoing was never greater.

The mining of lead ore was of decreasing importance during 1900, the principal centers of production having been in Meagher, Cascade, Flathead, Beaverhead, and Broadwater counties.

BEAVERHEAD COUNTY.

The yield of precious metals during 1900 was below that of the preceding year, as shown in the following table:

Metal.	1899.		1900.		Decrease.
	Quantity.	Value.	Quantity.	Value.	
Gold fine ounces..	7,822.485	\$161,705.11	6,216.928	\$128,515.31	\$33,189.80
Silver do.....	253,262.01	^a 327,449.87	233,323.71	^a 301,671.05	25,778.82
Copper fine pounds..	165,719	27,625.36	131,494	21,288.88	6,336.48
Lead do.....	1,038,894	46,438.56	1,013,524	44,290.99	2,147.57
Total		563,218.90		495,766.23	67,452.67

^a Coining value.

Recent years have witnessed but few changes in the mining operations of Beaverhead County, or in the discovery of new ore deposits, or the opening of districts previously unworked. The principal addition was the installation and operation of a dredging device near Grant to handle the gravels along Horse Prairie Creek. As in recent years dredging operations were pursued uninterruptedly along Grasshopper Creek, near Bannack. The mines and smelting plant of the Hecla Consolidated Mining Company, at Glendale, also continued operations with but little change in the conditions that have obtained at this property in recent years.

BROADWATER COUNTY.

The quantity and value of the mineral product from this county in 1900 is shown by the table below, and is compared with corresponding figures for the preceding year:

Metal.	1899.		1900.		Decrease.
	Quantity.	Value.	Quantity.	Value.	
Gold fine ounces..	8,262.627	\$170,803.66	6,644.593	\$137,355.93	\$33,447.73
Silver do.....	144,948.35	^a 187,407.96	108,644.53	^a 140,469.69	46,938.27
Lead fine pounds..	1,088,036	48,635.21	1,024,804	44,783.93	3,851.28
Total.....		406,846.83		322,609.55	84,237.28

^aCoining value.

The decrease arose principally in the district around Winston. The output from the Hassel district was also lower than in the former year. General activity characterizes operations in the districts around Winston, Radersburg, Hassel, and Diamond City. The ores of the Winston district are silver-lead, the principal producers during 1900 having been the East Pacific and Custer mines. Much exploration is said to have been done at the East Pacific and elsewhere in the district, with good results, and it is likely that the output from this district will be increased. There was an increase in the amount of metal produced in the district around Radersburg, where the Keating mine is the oldest and most important property. Some gold was washed from the gravels of Confederate Gulch, near Diamond City. Prospecting for quartz was also done. The Diamond Hill mines at Hassel produced but little bullion during the year, and, owing to the low grade of the ore experienced, the company owning and operating the mines have abandoned their work and are offering their entire milling plant for sale.

CASCADE COUNTY.

The output of the metals in this county during 1900 was less than in the former year, the amounts and values being shown below:

Metal.	1899.		1900.		Decrease.
	Quantity.	Value.	Quantity.	Value.	
Gold fine ounces..	2,128.526	\$44,000.54	2,001.155	\$41,367.54	\$2,633.00
Silver do.....	912,723.21	^a 1,180,086.57	781,448.35	^a 1,010,357.46	169,729.11
Lead fine pounds..	3,810,679	170,337.35	2,164,475	94,587.55	75,749.80
Total.....		1,394,424.46		1,146,312.55	248,111.91

^aCoining value.

This output of metals was taken from the Neihart and Barker districts, where the ores carry their principal values in silver and lead. Both camps showed activity during the year, and, while the product was less in 1900 than in the former year, the outlook for an improvement is encouraging. In the Neihart district the principal producers were the Broadwater, Diamond R., Florence, Big Snowy, and Galt mines.

The leading producer in the Barker district was the property of

Wright & Edwards, while the Gray Eagle, Liberty, Moulton, and Equator mines aggregated a considerable tonnage for the year. Here, too, there was some yield from small producing properties.

CHOTEAU COUNTY.

The precious metals produced in this county in 1900 came from the mines of the Landusky district in the Little Rocky Mountains, the quantities and values being as follows:

Metal.	1900.	
	Quantity.	Value.
Gold	<i>Fine ounces.</i> 1,643.623	\$33,976.70
Silver ^a	1,811.05	^a 2,341.55
Total value		36,318.25

^a Coining value.

DEERLODGE COUNTY.

An improvement in the output of precious metals from this county is to be noted for 1900. The values of the gold, silver, copper, and lead are shown in the following table in comparison with corresponding figures for 1899:

Metal.	1899.		1900.		Increase.	Decrease.
	Quantity.	Value.	Quantity.	Value.		
Gold.....fine ounces..	10,349.123	\$213,935.36	9,124.836	\$188,627.10		\$25,308.26
Silver.....do.....	4,493.37	^a 5,809.60	120,415.23	^a 155,688.38	\$149,879.78	
Copper.....fine pounds..	50,000	8,335.00	24,374	3,946.15		4,388.85
Lead.....do.....			399,000	17,436.30	17,436.30	
Total		228,079.96		365,697.93	167,316.08	29,697.11

^a Coining value.

The above product consisted of placer gold from the gulches throughout the county, and of arsenical iron and other ores from the mines tributary to Deer Lodge. The principal producer in the county was the Emery mine. This property shipped its product to the smelters for treatment and returns. Some ore was also taken by leasers from the old workings belonging to the Royal Mining Company.

FERGUS COUNTY.

The gold and silver added to the State's output by the mines of Fergus County in 1900, together with corresponding figures for the preceding year, are shown in the following table:

Metal.	1899.		1900.		Increase.
	Quantity.	Value.	Quantity.	Value.	
Gold.....fine ounces..	8,883.774	\$183,643.91	12,580.665	\$260,065.43	\$76,421.52
Silver.....do.....	5,380.64	^a 6,956.78	6,136.15	^a 7,933.61	976.83
Total		190,600.69		267,999.04	77,398.35

^a Coining value.

This county contains large bodies of low-grade refractory gold ores that have been impossible to work for many years by the methods then employed. However, with the advance that has been made in the successful adaption of the cyanide process to an increasing range of ores, it has been found possible to treat the Fergus County deposits successfully and profitably. The constantly increasing output of values by the mines belonging to and the growth of operations by the Great Northern Mining and Development Company, at Giltedge, have attracted attention to this county, and outside capital has entered the region, purchased new properties, and is arranging for the erection of new works for the treatment of these ore bodies. It is likely that the year 1901 will witness the production from this county about double what it was in 1900.

FLATHEAD COUNTY.

The production of precious metals in 1900 by Flathead County, when compared with that of the preceding year, was as follows:

Metal.	1899.		1900.		Increase.	Decrease.
	Quantity.	Value.	Quantity.	Value.		
Gold.....fine ounces..	802.264	\$16,584.27	1,350.132	\$27,909.70	\$11,325.43	-----
Silver.....do.....	47,380.14	^a 61,259.16	67,181.86	^a 86,861.39	25,602.23	-----
Lead.....fine pounds..	1,066,199	47,659.10	803,585	35,116.66	-----	\$12,542.44
Total	-----	125,502.53	-----	149,887.75	36,927.66	12,542.44

^a Coining value.

This indicates that the development done in this district during recent years must result in the county maintaining a place among the producing counties of the State. The output as yet is comparatively small, nevertheless it is likely to increase for some years until a uniform production shall be established and continued. The greater part of the present output comes from the district tributary to Libby, although nearly all sections of the county afford many promising prospects. The mines about Libby carry their principal values in gold, lead, and silver. Gold was also taken from the placers along Libby Creek and its tributaries.

GRANITE COUNTY.

A comparative table of the amounts and values of gold and silver won from the ores in this county during the years 1899 and 1900 is as follows:

Metal.	1899.		1900.		Decrease.
	Quantity.	Value.	Quantity.	Value.	
Gold.....fine ounces..	7,958.448	\$164,515.72	7,013.688	\$144,985.30	\$19,529.92
Silver.....do.....	1,989,213.53	^a 2,571,912.44	1,732,528.95	^a 2,240,037.43	331,875.01
Total.....	-----	2,736,428.16	-----	2,385,023.23	351,404.93

^a Coining value.

While a considerable quantity of the gold is taken from the placers and the small mines of this county, it is to the district around Philipsburg that nearly all the enormous quantity of silver in the above

table should be credited. This is the location of the famous Granite Mountain mine, besides other widely known properties, together with mammoth mills and refining plants. These properties carry nearly all values in the silver contents.

JEFFERSON COUNTY.

In the following table the values of the gold and silver for the years 1899 and 1900 are shown:

Metal.	1889.		1900.		Increase.	Decrease.
	Quantity.	Value.	Quantity.	Value.		
Gold.....fine ounces..	7,415.708	\$153,296.29	5,235.327	\$108,223.81	-----	\$45,072.48
Silver.....do.....	887,929.36	^a 1,148,029.88	69,053.25	^a 89,280.97	-----	1,058,748.91
Copper...fine pounds..	25,687	4,282.02	40,063	6,486.19	\$2,204.17	-----
Lead.....do.....	1,400,880	62,619.34	-----	-----	-----	62,619.34
Total	-----	1,368,227.53	-----	203,990.97	2,204.17	1,166,440.73

^a Coining value.

The decrease was due almost entirely to the abandonment of work at Elkhorn and to lessened operations elsewhere. Some of the principal producers of the previous year also show diminished outputs. Mining operations are carried on in all parts of the county, but principally in the districts around Elkhorn, Clancy, Whitehall, Boulder, Bernice, and Basin.

LEWIS AND CLARKE COUNTY.

The quantities and values of gold, silver, and lead produced from the mines and placers in this county during 1899 and 1900 were as follows:

Metal.	1899.		1900.		Increase.	Decrease.
	Quantity.	Value.	Quantity.	Value.		
Gold.....fine ounces..	62,535.675	\$1,292,727.13	70,006.241	\$1,447,198.78	\$154,471.65	-----
Silver.....do.....	203,251.90	^a 262,790.33	172,531.70	^a 223,071.29	-----	\$39,719.04
Lead...fine pounds..	500,000	22,350.00	218,005.00	9,526.82	-----	12,823.18
Total	-----	1,577,867.46	-----	1,679,796.89	154,471.65	52,442.22

^a Coining value.

This county is the largest producer of gold in the State, about one-third of the entire amount recovered being taken from the mines within its boundaries. The principal districts are around Marysville, Rimini, York, Jay Gould, Stemple, and Lincoln. In 1900 the Marysville district showed great activity and the output therefrom was very large.

From 1883 to 1900 the Montana Mining Company, Limited, has been worked steadily. In 1900 the greater part of the 110 stamps with which this mine is equipped were hung up and remained idle nearly the entire year. The ore deposits in the claims owned by the company are reported to be exhausted, and unless new discoveries are made from explorations now undertaken, it is likely that future milling operations at this property must cease. This company owns large quantities of tailings, which they are treating by the cyanide process, and it is only a question of time until this source of revenue must fail,

unless new ore bodies are discovered or obtained and milling operations resumed.

The long life of this company and its extensive operations has given an impetus to the mining industry in the State, and has been of material advantage to the commercial life and growth of the region in which it is situated.

The Bald Butte Mining Company, whose mines are situated on the Continental Divide, enjoyed a year of uninterrupted and profitable operation, and at the close of the year the prospect for 1901 was assured.

The 40-stamp mill with which this property is equipped for the reduction of its ores was operated at its usual high point of efficiency during the year.

The Belmont mine, near Marysville, was operated by the Penobscot Mining Company throughout the year. These ores are more refractory than those handled by the other large mills in the district, yet a high percentage saving of the values is effected by immediate cyaniding after the tailings leave the amalgamating tables.

During 1900 the 40-stamp mill belonging to Thomas Cruse reduced a large tonnage of ores from the Bald Mountain and North Star mines. Other properties around Marysville were discovered and explored, and some ore therefrom was mined and milled during 1900. Notably among such were those at Empire, Gloster, and Big Ox. Prospecting was also active near Granite Butte, Jay Gould, and Stemple, all of which adjoin the Marysville district.

The York district, east of the Missouri River, showed considerable activity in prospecting and placer mining. Some bullion was won from the ores mined there, while the returns from the placers was considerable.

A large quantity of low-grade base ores was shipped from the Rimini district. Values were also recovered from the districts around Unionville, Lincoln, and Butler. The large works at East Helena for the reduction of custom ores and mine products produced in the State continued operations throughout the year. The tonnage of material handled was largely increased over that of former years, and in order to treat this new and extensive additions are being made. The plant at Canyon Ferry, where a dam has been built across the Missouri River, furnished the reduction works at East Helena with electrical power. In order to supply this power to the mines and works at Butte, a line is being built from Canyon Ferry to that city, and the plant itself is being greatly increased in size and capacity.

MADISON COUNTY.

The output of precious metals in Madison County in 1900 showed some increase over the year 1899, as is set forth by the following comparisons:

Metal.	1899.		1900.		Increase.	Decrease.
	Quantity.	Value.	Quantity.	Value.		
Gold.....fine ounces..	23,708.977	\$490,108.05	26,859.374	\$555,232.54	\$55,124.49	-----
Silver.....do.....	104,350.74	^a 134,918.12	130,634.02	^a 168,900.55	33,982.43	-----
Copper...fine pounds..	40,000	6,668.00	18,000	2,914.20	-----	\$3,753.80
Lead.....do.....	370,477	16,560.32	222,000	9,701.40	-----	6,858.92
Total	-----	648,254.49	-----	736,748.69	89,106.92	10,612.72

^aCoining value.

The mining done in this county is confined to the South Boulder and McCarty ranges. The principal centers are at Virginia City, Sheridan, Rochester, Silver Star, Twin Bridges, Parrott. Pony, Red Bluff, Norris, and Revenue.

MEAGHER COUNTY.

The figures of the production of gold and silver won from the mines at Castle and elsewhere in the county during 1900 are as follows, a comparison being made with similar data for 1899:

Metal.	1899.		1900.		Increase.	Decrease.
	Quantity.	Value.	Quantity.	Value.		
Gold..fine ounces..	242.857	\$5,020.30	168.446	\$3,482.09		\$1,538.21
Silver.....do.....	150,020.86	^a 193,966.36	255,610.35	^a 330,486.11	\$136,519.75	
Lead..fine pounds..	5,000,000	223,500.00	4,500,000	196,650.00		26,850.00
Total		422,486.66		530,618.20	136,519.75	28,388.21

^aCoining value.

MISSOULA COUNTY.

The entire product from this county consists of high-grade placer gold taken from various gulches. The output for 1899 and 1900 is shown below:

Metal.	1899.		1900.		Increase.
	Quantity.	Value.	Quantity.	Value.	
Gold.....fine ounces..	2,749.898	\$56,845.44	3,229.399	\$66,757.60	\$9,912.16
Silver.....do.....	100.96	^a 130.53	151.39	^a 195.74	65.21
Total.....		56,975.97		66,953.34	9,977.37

^aCoining value.

PARK COUNTY.

The development of the mines belonging to the Bear Gulch Mining Company, at Jardine, is bringing this county into prominence as a producer. A gain was made in 1900 over the yield of the previous year, as shown by the following figures:

Metal.	1899.		1900.		Increase.
	Quantity.	Value.	Quantity.	Value.	
Gold.....fine ounces..	5,883.176	\$121,616.04	9,778.754	\$202,144.78	\$80,528.74
Silver.....do.....	458.72	^a 593.09	1,927.23	^a 2,491.77	1,898.68
Total.....		122,209.13		204,636.55	82,427.42

^aCoining value.

Besides the mines at Jardine, values were won in 1900 from placers and from the mines at Crevasse, Contact, and Cooke City.

SILVER BOW COUNTY.

Nearly the entire yield of precious metals in 1900 was contained in the copper ores mined at Butte, the output in 1899 and 1900 having been as follows:

Metal.	1899.		1900.		Decrease.
	Quantity.	Value.	Quantity.	Value.	
Gold fine ounces..	62,038.377	\$1,282,447.08	54,552.115	\$1,127,692.30	\$154,754.78
Silver ^a do.....	9,855,831.97	^a 12,742,893.88	9,454,279.36	^a 12,223,714.73	519,179.15
Copper ..fine pounds..	245,245,908	40,882,492.86	245,783,551	39,792,356.90	1,090,135.96
Total.....		54,907,833.82		53,143,763.93	1,764,069.89

^a Coining value.

The above values show the enormous amount of production by the Butte mines. Besides the values won from copper ores, some returns are secured from the placers of the county and from silver ores.

The following statistical tables of Montana production, showing the quantity and values of the precious metals, their origin by counties, and from the several classes of ores, together with the final disposition of the ores and bullion as to the sale and treatment, have been assembled from confidential returns furnished by the producers.

These totals have been verified by comparison with those made from figures and data given by the United States mints and assay offices and the smelters and refineries that handled the Montana product.

DEPOSITS AT THE UNITED STATES ASSAY OFFICE, HELENA, MONT., DURING THE CALENDAR YEAR 1900.

Source of deposit.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Value.	
Montana:					
Beaverhead County.....	445.590	\$8,290.04	48.49	\$26.97	\$8,317.01
Broadwater County.....	3,074.922	57,207.82	308.61	167.69	57,375.51
Cascade County.....	5.067	94.27	.25	.14	94.41
Custer County.....	14.449	268.82	3.93	2.22	271.04
Deerlodge County.....	4,704.836	87,531.76	665.23	363.71	87,895.47
Flathead County.....	1,119.113	20,820.70	157.63	85.51	20,906.21
Granite County.....	1,316.698	24,496.70	201.98	108.99	24,605.69
Jefferson County.....	2,036.021	37,879.41	160.85	88.10	37,967.51
Lewis and Clarke County.....	32,770.600	609,685.47	14,090.18	7,654.44	617,339.91
Madison County.....	11,846.017	220,391.51	2,557.98	1,414.41	221,805.92
Meagher County.....	168.446	3,133.86	10.35	5.76	3,139.62
Missoula County.....	3,229.399	60,081.82	151.39	84.00	60,165.82
Park County.....	8,384.754	155,995.34	1,597.23	873.54	156,868.88
Ravalli County.....	828.738	15,418.36	54.76	30.24	15,448.60
Silverbow County.....	2,998.396	55,784.06	872.17	478.03	56,262.09
Total Montana.....	72,943.076	1,357,079.94	20,881.03	11,383.75	1,368,463.69
Alaska.....	259.654	4,830.76	49.26	27.80	4,858.56
Georgia.....	145.053	2,698.65	7.69	4.34	2,702.99
Idaho.....	11,069.125	205,937.12	2,181.76	1,194.00	207,131.12
Oregon.....	1,086.704	20,217.75	256.26	142.00	20,359.75
Washington.....	156.775	2,916.73	51.50	29.10	2,945.83
Northwest Territory.....	709.673	13,203.21	176.71	97.50	13,300.71
British Columbia.....	25,883.978	481,562.32	12,353.84	6,761.49	488,323.81
Jewelry.....	28.033	521.54	7.66	4.10	525.64
Redeposits.....	45.310	842.98	5.52	2.93	845.91
Total.....	39,384.305	732,731.06	15,090.20	8,263.26	740,994.32
Grand total.....	112,327.381	2,089,811.00	35,971.23	19,647.01	2,109,458.91

PRODUCTION OF GOLD AND SILVER IN MONTANA DURING THE CALENDAR YEAR 1900.

Summary by counties.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Beaverhead	6,216.928	\$128,515.31	233,323.71	\$301,671.05	\$430,186.36
Broadwater	6,644.593	137,355.93	108,644.53	140,469.69	277,825.62
Cascade	2,001.155	41,367.54	781,448.35	1,010,357.46	1,051,725.00
Choteau	1,643.623	33,976.70	1,811.05	2,341.55	36,318.25
Custer	14.449	298.69	3.93	5.08	303.77
Deerlodge	9,124.836	188,627.10	120,415.23	155,688.38	344,315.48
Fergus	12,580.665	260,065.43	6,136.15	7,933.61	267,999.04
Flathead	1,350.132	27,909.70	97,181.86	86,861.39	114,771.09
Granite	7,013.688	144,985.80	1,732,528.95	2,240,637.43	2,385,023.23
Jefferson	5,235.327	108,223.81	69,053.25	89,280.97	197,504.78
Lewis and Clarke	70,008.241	1,447,198.78	172,531.70	223,071.29	1,670,270.07
Madison	26,859.374	555,232.54	130,634.02	168,900.55	724,133.09
Meagher	168.446	3,482.09	255,610.35	330,486.11	333,968.20
Missoula	3,229.399	66,757.66	151.39	195.74	66,953.34
Park	9,778.754	202,144.78	1,927.23	2,491.77	204,636.55
Ravalli	828.738	17,131.53	54.76	70.80	17,202.33
Silverbow	54,552.115	1,127,692.30	9,454,279.36	12,223,714.73	13,351,407.03
Returns from custom smelters, mints, and assay offices impossible to classify by counties	11,864.419	245,259.32	1,159,099.29	1,498,633.45	1,743,892.77
Total	229,114.882	4,736,224.95	14,294,835.11	18,482,211.05	23,218,436.00

BULLION OF MONTANA PRODUCTION DEPOSITED AT THE UNITED STATES ASSAY OFFICE, HELENA, MONT., DURING THE CALENDAR YEAR 1900.

Origin.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Commercial value.	
Placer gold	20,092.284	\$373,809.61	2,797.20	\$1,540.07	\$375,349.68
Mill bullion	52,850.792	983,270.33	18,083.83	9,843.68	993,114.01
Total	72,943.076	1,357,079.94	20,881.03	11,383.75	1,368,463.69

BULLION OF MONTANA PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1900.

Institution.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coining value.	
Mints:					
Denver	112.136	\$2,086.25	11.93	\$13.88	\$2,100.13
Philadelphia	2,704.178	50,310.29	2,941.68	3,423.04	53,733.33
San Francisco	82.150	1,528.37	10.25	11.93	1,540.30
Assay offices:					
Boise	6,725.295	125,121.77	539.14	627.36	125,749.13
Helena	72,943.076	1,357,080.48	20,881.03	24,297.93	1,381,378.41
New York	27,799.832	517,206.18	32,782.97	38,147.46	555,353.64
Seattle	4.715	87.72	2.17	2.52	90.24
Total	110,371.382	2,053,421.06	57,169.17	66,524.12	2,119,945.18

PRODUCTION OF GOLD AND SILVER IN MONTANA (ORIGIN DETAILED) DURING THE CALENDAR YEAR 1900.

Origin.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Placer bullion	26,709.214	\$552,128.45	3,252.20	\$4,204.86	\$556,333.31
Mill bullion	70,350.342	1,454,270.64	1,766,692.59	2,284,208.60	3,738,479.24
Cyanide mill bullion	42,923.697	887,311.57	109,452.68	141,514.58	1,028,826.15
In copper ores	54,252.098	1,121,490.40	9,324,085.39	12,055,383.13	13,176,873.53
In lead ores	7,918.654	163,693.10	2,134,802.18	2,760,148.27	2,923,841.37
In dry ores and concentrates, classed as smelting ores	26,960.877	557,330.79	956,550.07	1,236,751.61	1,794,082.40
Total	229,114.882	4,736,224.95	14,294,835.11	18,482,211.05	23,218,436.00

ORIGIN, BY PERCENTAGES, OF THE PRODUCTION OF GOLD AND SILVER IN MONTANA DURING THE CALENDAR YEAR 1900.

Origin.	Gold.	Silver.
	<i>Percentage.</i>	<i>Percentage.</i>
Placer bullion	11.66	0.02
Mill bullion	30.71	12.41
Cyanide mill bullion	18.73	.71
Copper ores	23.68	65.23
Lead ores	3.45	14.94
Dry ores	11.77	6.69
Total	100	100

PRODUCTION OF COPPER AND LEAD IN MONTANA DURING THE CALENDAR YEAR 1900.

Summary by counties.	Copper.	Lead.
	<i>Fine pounds.</i>	<i>Fine pounds.</i>
Beaverhead	131,494	1,013,524
Broadwater		1,024,804
Cascade	883	2,164,475
Deerlodge	24,374	399,000
Fergus		8,392
Flathead		803,585
Jefferson	40,063	
Lewis and Clarke		218,005
Madison	18,000	222,000
Meagher		4,500,000
Silverbow	245,783,551	211,971
Custom smelters in addition to the above not possible to distribute by counties		5,478,995
Total production	245,998,365	16,044,751

DISPOSITION OF GOLD AND SILVER OF MONTANA PRODUCTION DURING THE CALENDAR YEAR 1900.

Disposition.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Deposited at the United States mints and assay offices	99,334.244	\$2,053,421.06	51,452.26	\$66,524.12	\$2,119,945.18
Shipped to custom smelters and refineries by producers	129,780.638	2,682,803.89	14,243,382.85	18,415,686.93	21,098,490.82
Total	229,114.882	4,736,224.95	14,294,835.11	18,482,211.05	23,218,436.00

TOTAL PRODUCTION OF PRECIOUS METALS IN MONTANA DURING THE CALENDAR YEAR 1900.

Description.	Quantity.	Value.
Gold.....fine ounces..	229, 114. 882	\$4, 736, 224. 95
Silver (coining value).....do..	14, 294, 835. 11	18, 482, 211. 05
Copper, at \$16.19 per hundredweight.....fine pounds..	245, 998, 365	39, 827, 135. 29
Lead, at \$4.37 per hundredweight.....do..	16, 044, 751	701, 155. 62
Total		63, 746, 726. 91

PRODUCTION OF GOLD, SILVER, COPPER, AND LEAD IN THE STATE OF MONTANA FROM THE YEAR 1862 TO 1900, INCLUSIVE.

Year.	Gold.	Silver. ^a	Copper.	Lead.	Total.	Yearly increase.
						<i>Per cent.</i>
1862 to 1881, inclusive ^b	\$200, 000, 000	\$11, 000, 600			\$211, 000, 000	
1882	2, 550, 000	4, 370, 000	\$1, 539, 860		8, 459, 860	
1883	1, 800, 000	6, 000, 000	3, 452, 960	\$226, 424	11, 479, 384	37½
1884	2, 170, 000	7, 000, 000	5, 386, 500	246, 326	14, 802, 826	31
1885	3, 400, 000	11, 500, 000	6, 779, 800	274, 350	21, 954, 150	50
1886	4, 422, 000	13, 849, 000	5, 761, 200	494, 132	24, 526, 332	12
1887	5, 978, 536	17, 817, 548	8, 853, 750	607, 662	33, 257, 496	35½
1888	4, 200, 253	15, 790, 736	15, 103, 946	569, 160	35, 664, 095	7½
1889	3, 500, 000	19, 393, 939	13, 334, 970	456, 975	36, 685, 884	3
1890	3, 300, 000	20, 363, 636	16, 656, 437	675, 392	40, 995, 465	11½
1891	2, 890, 000	20, 139, 394	14, 377, 336	1, 229, 027	38, 635, 757	5½
1892	2, 891, 386	22, 432, 323	19, 105, 464	990, 035	45, 419, 208	18
1893	3, 576, 000	21, 858, 780	16, 630, 958	964, 089	43, 029, 827	^c 5
1894	3, 651, 410	16, 575, 458	17, 233, 718	730, 551	38, 191, 137	^c 11
1895	4, 327, 040	22, 886, 992	21, 114, 869	754, 360	49, 083, 261	28½
1896	4, 380, 671	20, 324, 877	25, 356, 541	670, 010	50, 732, 099	3½
1897	4, 496, 431	21, 730, 710	26, 798, 915	928, 619	53, 954, 675	6
1898	5, 247, 913	19, 159, 482	26, 102, 616	809, 056	51, 319, 067	5
1899	4, 819, 157	21, 786, 835	40, 941, 906	909, 410	68, 457, 308	33
1900	4, 736, 225	18, 482, 211	39, 827, 135	701, 156	63, 746, 727	^c 7
Total	272, 337, 022	332, 461, 921	324, 358, 881	12, 236, 734	941, 394, 558	

^a Coining value.

^b No annual compilations were made prior to 1881.

^c Decrease.

NEVADA.

By R. K. COLCORD,

Assayer in charge of United States mint, Carson City, Nev.

Nevada's production of gold and silver for the calendar year 1900 was:

Gold	\$2, 023, 803
Silver	1, 931, 075
Total production for the year 1900	3, 954, 878
Total production for the year 1899	3, 740, 790
Increase	214, 088

In confirming the preliminary estimate of the production of the gold and silver from the mines of Nevada for the calendar year ending December 31, 1900, it will be noted that the final compilation checks up very closely with the telegraphic report sent at the close of the year. The preliminary estimate was based upon the returns of the county assessors to the State controller and surveyor-general, reports received from individual producers and the mining and milling companies, together with the Carson mint receipts.

Final estimate for the year 1900	\$3, 954, 878
Preliminary estimate for 1900	3, 940, 000
Difference	14, 878

The final estimate, as shown by the tables below, have been verified by comparison with those made from figures and data given by the various United States mints and assay offices and the smelters and refineries that handled the Nevada product. Of the total amount only about \$20,000 was taken from placer mines, mostly by Chinamen. The balance is from quartz, mill tailings, silver-lead and copper ores.

The installation of cheap electric power on the Comstock lode for pumping, hoisting, milling, and lighting (now in course of construction) gives every hope of renewed prosperity and a greatly increased production of bullion from these famous mines for many years to come.

During the past year two entirely new and apparently very important mining discoveries have been made, the most promising of which is on the line of Esmeralda and Nye counties, where a series of large veins, carrying 1 or 2 ounces of gold and 50 to 100 ounces of silver to the ton. This camp, called Tonapah, is situated 50 miles from the Carson and Colorado Railroad. About a hundred men are now employed developing the different ledges, and there is no doubt but that this new district will soon become quite an extensive bullion producer.

In Washoe County, near Rene, a very rich discovery of silver ore has been made. From this find several carloads of ore that yielded an average of 700 ounces per ton have been shipped.

Outside capital is seeking investment in copper properties in Esmeralda, Humboldt, Lyon, and Lincoln counties. A wealthy corporation of Montana is operating extensively at Yerington, in Lyon County, and are preparing to erect a large smelting plant.

No important gold discoveries have been made during the year,

though several old mines are being reopened. A large group of gold mines at Berlin, Nye County, has been sold to an Eastern company, which has erected a 30-stamp mill and is now making regular shipments of bullion.

Aside from the Comstock lode and the great silver mines of Eureka, the mining resources of Nevada are practically undeveloped. The reason of this is not far to seek—when it is known that the State has produced over \$500,000,000 in gold and silver and that its total assessed valuation to-day is only about \$25,000,000, the rapid decline which has taken place during the past ten years is not surprising. The golden eggs have disappeared, together with the men who owned them. It is the general opinion, however, that the tide has turned and that we are now entering upon an era of prosperity. From this on Nevada will continue to show a substantial increase in her bullion output.

**BULLION OF NEVADA PRODUCTION DEPOSITED AT THE UNITED STATES MINTS
AND ASSAY OFFICES DURING THE CALENDAR YEAR 1900.**

Institution.	Gold.		Silver.	
	Standard ounces.	Value.	Standard ounces.	Value.
Mints:				
Denver.....	153,563	\$2,856.98	15.96	\$18.57
San Francisco	24,490	455,627.91	587,614	683,753.53
Assay office:				
New York.....	47,933.716	891,790.06	86,584.64	100,750.75
Total	72,577.279	1,350,274.95	674,214.60	784,522.85
To which add returns from custom smelters and refineries.....	36,202.139	673,528.17	985,340.48	1,146,552.03
Grand total	108,779.418	2,023,803.12	1,659,555.08	1,931,074.88

PRODUCTION OF GOLD AND SILVER IN NEVADA DURING THE CALENDAR YEAR 1900.

County.	Gold.	Silver. ^a	Total.
Douglas.....	\$526	\$7	\$533
Elko.....	229,800	110,790	340,590
Esmeralda.....	124,980	55,836	180,816
Eureka.....	76,800	493,265	570,065
Humboldt.....	73,230	80,551	153,781
Lander.....	80,075	137,190	217,265
Lincoln.....	900,106	320,806	1,220,912
Lyon.....	80,065	55,975	136,040
Nye.....	50,004	52,676	102,680
Ormsby.....	32,220	101,800	134,020
Storey.....	125,113	292,210	417,323
Washoe.....	65,454	60,909	126,363
White Pine.....	185,430	169,060	354,490
Total.....	2,023,803	1,931,075	3,954,878

^a Coining value.

SOURCE OF PRODUCTION.

Gold:	Fine ounces.	Fine ounces.
Quartz.....	96,911	
Placer.....	990	
		97,901
Silver:		
Quartz.....	1,125,000	
Lead ores.....	368,566	
		1,493,566
Total		1,591,467

THE COMSTOCK LODGE.

By ALFRED DOTEN, *Virginia City, Nev.*

From its discovery in 1859, ten years after the memorable rush from all parts of the world by the Argonauts of '49 to California's golden strand, the Comstock lode, situated in Storey County, State of Nevada, has posed as the first and greatest silver mine in the United States. Its grand yield of silver, amounting to over \$200,000,000, entitles it to that distinction, although it has also produced nearly as much gold as silver, contributing during the last forty years more than \$400,000,000 to the precious bullion wealth of the world.

Its locality, near the eastern base of the Sierra Nevada, brings it in contemporaneous line, as it were, with the silver mines of the Sierra Madre, in Mexico, a few hundred miles southeastwardly. Great and famous mines have been worked in the Sierra Madre and other parts of Mexico for centuries, yielding vastly more silver than the Comstock or other mines of lesser note in our silver State, Nevada, but none of them were ever developed as rapidly or made to yield so great an amount of wealth in the same short space of time.

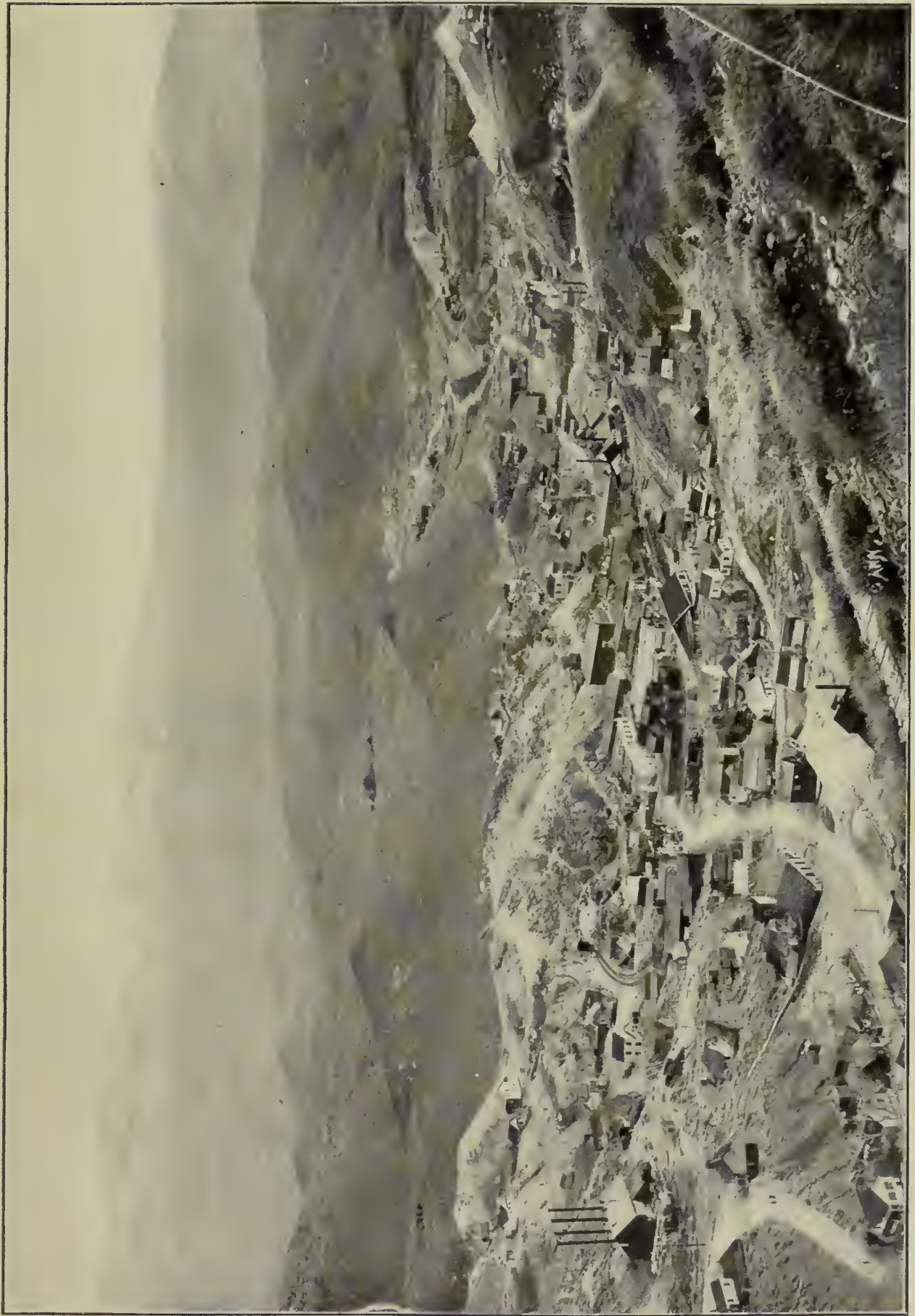
Situated just a few miles east from the California line, the Comstock lode ranges in a southeasterly direction along steep mountain sides and ravines toward Carson River. Its regular dip downward into the bowels of the earth is eastward 45° to the lowest depth explored, 3,300 feet, and its generally developed or defined length is about 4 miles. Its width may be approximately stated at from a quarter to half a mile, more or less, from the pretty well understood west wall to the somewhat undefined eastern boundary, thus including the so-called Brunswick lode, running parallel and immediately east, which is claimed to be one of the fissures of the Comstock and is being thus held and worked as belonging to the Chollar and other mines lying west of it. In fact, even Sutro himself was not able to positively define just at what particular point his big tunnel passed into the broad Comstock lode.

THE GREAT ORE CHANNEL.

This wide and extensive ore channel is composed of many fissure veins or deposits of various sizes, lengths, and depths with relative position toward each other, the "bonanzas," or richest and best ore bodies, being of widely varied extent and capacity, yielding from \$100,000 to many millions with equal facility. Practically speaking, bonanzas form exceptions to the general character of the lode, which is composed of quartz, porphyry, and clay, quartz being the gangue carrying the precious metals. Consequently the only sagacious rule for finding pay ore, or bonanzas, has been to follow quartz veins or leads wherever encountered in the explorations.

And thus it was that the main body of the old lode got pretty well washed out in the lively passing years of mining activity, and the outskirt leavings, or offshoots of ore, remain, with possibilities of leading to stray bonanzas somewhere and especially in the unexplored greater depths. Or perhaps the Sutro tunnel may some day be extended farther westward through the hard and forbidding syenite or diorite west wall, Mount Davidson formation, to rich bullion veins beyond.

No dividend-paying bodies of ore were found below the Sutro tunnel level, and the deepest explorations, 3,300 feet below the surface, proving to be not only the poorest, but the most costly, by reason of the



THE TOWN OF GOLD HILL, COMSTOCK LODE.

Bird's-eye view, taken from the steep hillside near the Bullion mine, looking southward down Gold Canyon toward Silver City and Carson River. Como or Palmyra Range in the distance beyond.

overpowering amount of water encountered, deep mining in the Virginia section was finally abandoned October 13, 1886, at the Combination shaft and these deep levels allowed to fill up, the water eventually rising nearly to the tunnel level, about 1,600 feet in depth. Deep mining in the Gold Hill section had been abandoned from the same cause about four years previously.

TOPOGRAPHICALLY CONSIDERED.

Virginia City, extending from Cedar Hill and Six Mile Canyon southward, covers practically the main northern part of the lode, the town of Gold Hill, immediately adjoining it on the south, at the head of Gold Canyon, covering that section and Silver City, 2 miles farther down the canyon toward Carson River, being generally considered as including the southerly terminus of the lode, comprising a distance of about 4 miles.

The mills on Carson River which are or have been engaged in the reduction of Comstock ores are scattered along from Empire, in Ormsby County, down to Dayton and Sutro, in Lyon County, about a dozen miles, the mining, milling, and tailings distribution of the Comstock ore product thus being included within Storey, Ormsby, and Lyon counties. Some of the earliest milling was done over in Washoe Valley and County, the ore having to be hauled by teams 10 or 12 miles. This was abandoned long ago, the mills dismantled, and one small cyanide plant is engaged in working what is left of those old mill tailings.

The largest and most productive ore bodies, or bonanzas, were found beneath Virginia City, although carrying proportionally less gold than those of Gold Hill. The ores of Silver City are principally gold, found in small veins scattered throughout the district, only the larger ones carrying a small percentage of the Comstock silver. But it will be borne in mind that it was the placer-gold washings at that point and below, in Gold Canyon, as also later in Six Mile Canyon, by the early gold-seeking emigrants to California that led to the Comstock discovery, both ravines heading within about a mile of each other in the main body of the old lode itself at the base of Mount Davidson.

DISCOVERED AS A GOLD MINE.

Thus it was that the Comstock lode was practically discovered in June, 1859, by Pete O'Riley and Mike McLaughlin as a gold mine and the real source of the gold washings in the two large ravines or canyons below, where they had been placer mining together for years; and they did not suspect even for a moment that the heavy metallic "black stuff" detrimentally clogging their rockers, riffles, and pans, obliging them to scrape or shovel it aside out of their way in working and washing the ragged gold from the decomposed quartz composing the surface outcrop or apex of the lode, was simply the richest sulphurets of silver. That important discovery was made for them a short time later on by other parties, more experienced in minerals, examining their peculiar find. Indeed, had it depended on silver, the Comstock discovery would not have been made. Silver ore was something totally unknown and unsought in the Territory of Nevada.

All of that "black stuff" was carefully and expeditiously scraped up and packed over the Sierra to California for treatment or judiciously piled aside for future reference. Having no appliances for working silver ore, during the few weeks remaining before winter

closed mining and prospecting operations all attention was paid to gold extraction and the active location of mining claims along the lode by various parties who had got in on the startling new discovery, which, incidentally, received its name from Henry Comstock, one of the claim locators.

THE GOLD HILL COMSTOCK SECTION.

Although the silver-mining discovery was made first at Virginia, in the surface outcroppings of what was subsequently the Ophir mine, Sandy Bowers and others, for years placer mining in Gold Canyon, had already followed the lead of the gold washings up to their evident sources, a bold, rocky little hill, or outcrop of quartz, 40 or 50 feet high and 300 or 400 feet in length. They found the decomposed quartz exceedingly rich in gold and very shortly had the whole hill located and divided up into 10 or 20 foot claims.

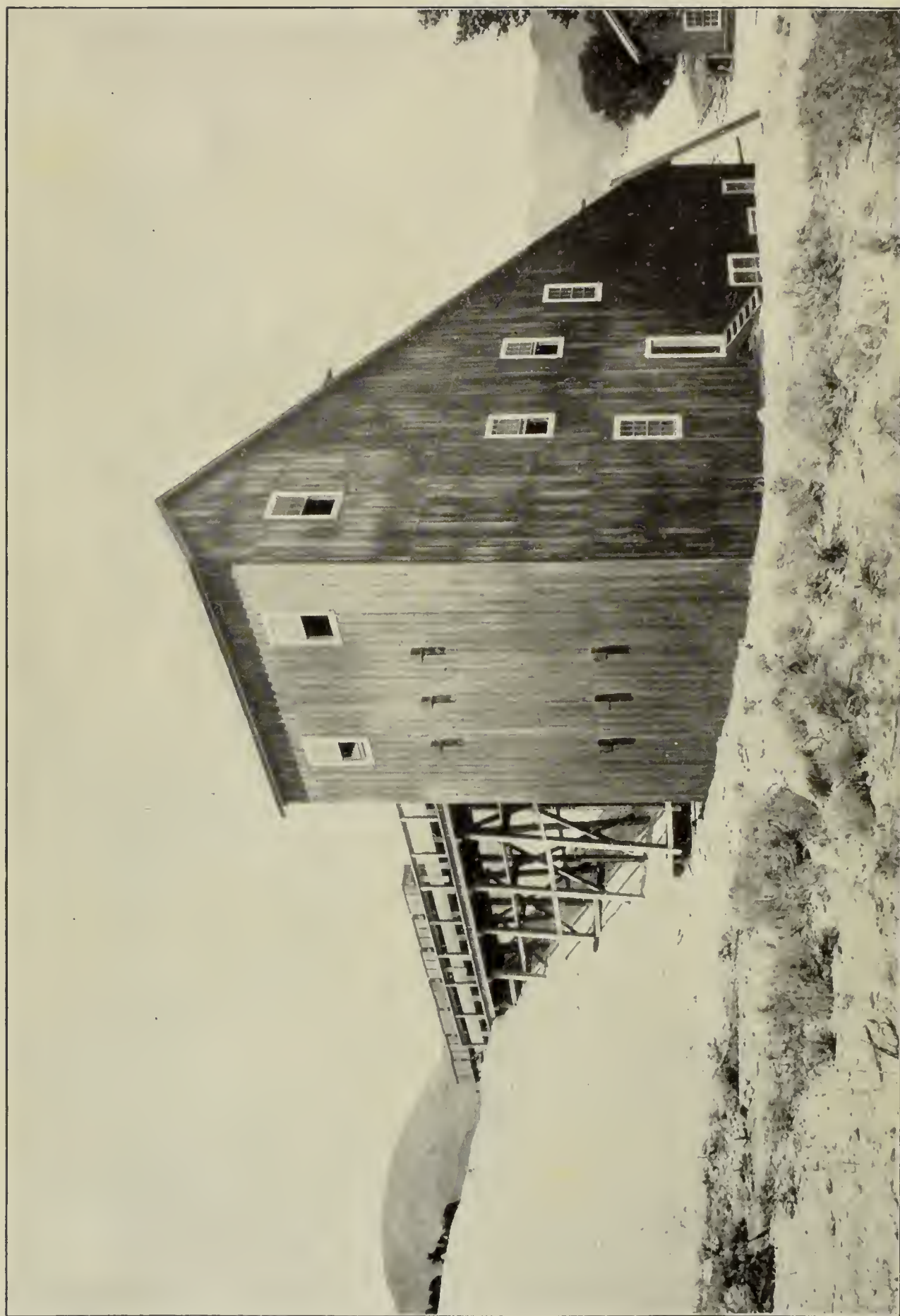
Gold Hill naturally became its name by common consent, subsequently proving to be rich also in silver and to be one of the strongest and best paying outcrops or "chimneys" of the Comstock lode. Its richest bonanza wealth, extending 700 or 800 feet in depth, was worked out years ago, the "hill" itself thus disappearing, and the town of Gold Hill, at one time having about 7,000 inhabitants, is now comparatively depopulated and dilapidated, the principal mines forming its foundations, the Imperial, Challenge, Confidence, Yellow Jacket, Crown Point, and Belcher, having been worked out of their original bonanza productiveness and subsided into low-grade pickings and deeper explorations for good-paying ore.

The famous Crown Point and Belcher bonanza, extending down to the 1,700 level, yielded over \$60,000,000 in its time. The Yellow Jacket new shaft, 3,000 feet vertical depth, developing no pay ore, is one of the deepest on the lode, and the Imperial and the Belcher shafts and workings are nearly as deep. The Belcher 2,700 level, south end, had the best showing for another rich old-time bonanza of any on the lode when the great inburst of water, tapped by the Alpha mine twenty years ago, flooded all the mines of the Gold Hill section, and it still remains submerged in 1,500 feet of water, waiting for the projected electric pumps to come to its rescue. A branch of the Comstock was supposed to swing around to the right, or westward, below the Belcher, over on American Flat, but that proposition was never satisfactorily defined or decided.

SILVER CITY COMSTOCK TERMINUS.

The southerly continuation of the great lode, or ore channel, assumes more of an easterly trend after passing Gold Hill, following down the canyon a couple of miles to an apparently diffusive ending at Silver City, which is just over the line into Lyon County, where it breaks up into numerous little veins or branches, scattered around among the hills and ravines, stray indications even extending 2 or 3 miles beyond, to Carson River. Thus there are many small gold veins from a few feet to a few inches in width, owned by two or three miners or even a single miner working alone, making good pay or a good, comfortable living for years.

There are no deep shafts, by reason of too much water to contend with, and very little silver in any of the veins, much less than any portion of the Comstock, which, perhaps, is the reason why they named the little town Silver City. Its somewhat scattered population



COMSTOCK ORE-REDUCTION MILL.
At the mouth of the Sutro Tunnel, near Carson River.

is estimated at about 1,200. Two ore reduction mills, of 30 or 40 tons daily capacity each, are kept constantly busy on custom or contract work; also two cyanide plants working Comstock tailings. Altogether, Silver City is a very flourishing community and one of the best poor man's mining camps in the State.

STEAMBOAT SPRINGS COMSTOCK.

The northerly extent of the great lode, beyond the Utah mine, is undefined and scattered, many branches being claimed. For years, however, mining experts have expressed opinion that the famous public resort known as Steamboat Springs, 8 miles northwest from Virginia, in Washoe County, shows very demonstrative foundation for belief in its Comstock origin or emanation. Many years ago, when the mining shafts of Virginia and Gold Hill, with constantly increasing heat, had attained a depth of about 1,700 feet, springs or shafts of scalding water were encountered, adding very materially to the oppressive heat, difficulties, and expense of the deep explorations. The great ore channel, running through beneath the Mount Davidson range, would consistently connect with these boiling springs in the valley beyond. Be that as it may, Steamboat Springs is a strongly mineralized locality. Good ore indications have been found about there at various times in years past, and recently boring tests have revealed ore at the depth of about 200 feet, giving high assays in both silver and gold. This is in the immediate vicinity of the springs, and shafts are being sunk to strike the vein or deposit. The character of the ore is all right, and it is confidently claimed to be an extension of the old Comstock. Miners' picks and further time will solve the problem.

THE SUTRO TUNNEL.

The world-renowned Sutro tunnel, nearly 4 miles in length, projected by Adolph Sutro, is one of the most essentially important features in the practical working development of the Comstock lode. He personally broke ground at its commencement in 1869, ten years after the discovery of the great lode, and stayed with it from start to finish. Not a shaft in any of the mines had reached the depth of 1,000 feet, and great difficulty, as well as fearful expense, was encountered in pumping or otherwise disposing of the large and constantly increasing quantities of water met with as greater depth was attained; therefore the tunnel was a very apparent and absolute necessity.

Sutro was a milling and mining operator and had but little money, but he possessed the most indomitable energy and enterprise of anybody and soon succeeded in substantially interesting European capitalists with him in his grand project. The result was that the main tunnel was carried through to completion ten years later, in 1879. It is 12 feet high and wide, properly timbered wherever required, having a substantial car track throughout, with all necessary switches, and a capacious double-box subdrain beneath the floor of the tunnel to carry off all the water possible for the Comstock drainage to supply.

The mouth of the tunnel, or starting point, was judiciously selected in the low hills bordering Carson River Valley, and its course is westward, intersecting the heart of the Comstock near by at right angles and about midway of its developed working depths, 1,650 feet vertically below the general surface of the principal mining shafts, the

objective point being the main shaft of the Savage mine, a distance, as before remarked, of nearly 4 miles. (Plate.)

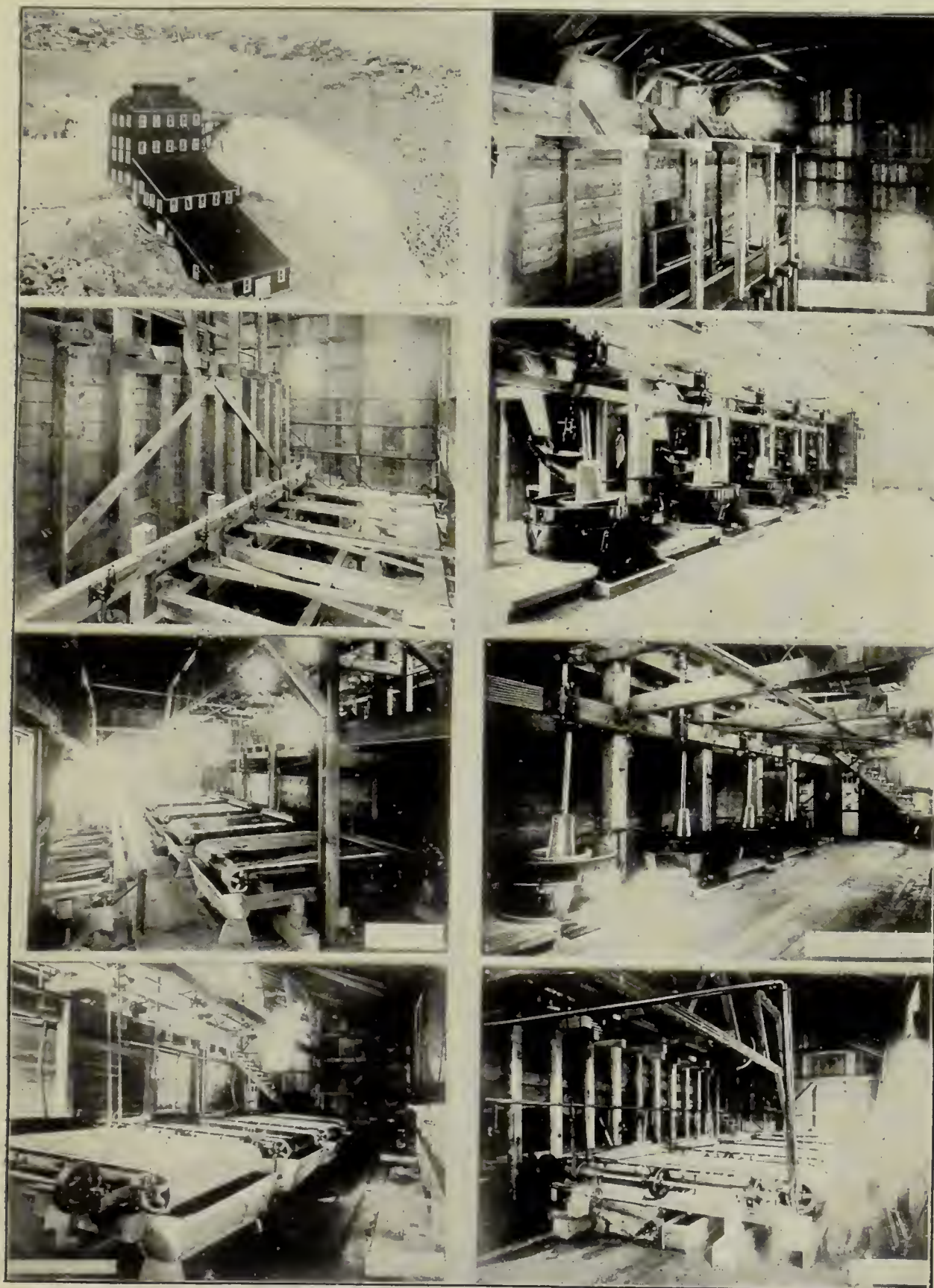
Lateral drifts, north and south along the east side of the lode, were subsequently made, north 4,400 feet through the Gould and Curry, Consolidated California and Virginia, and other intervening mines, extending 335 feet into the Mexican mine. The south lateral branch connects with the mines of the Gold Hill section, running 8,420 feet to the Forman shaft of the Overman and Caledonia companies, intersecting it 1,600 feet below the surface, from which point a south-westerly drift 2,465 feet connects with the Alta mine shaft. It is also proposed to eventually run a drift from the Forman shaft 8,000 feet to connect with the old Dayton shaft at Silver City, thus establishing a much-needed new drainage level 400 feet lower than the deepest workings of the valuable and productive group of mines at that end of the Comstock. The mines of American Flat will also be eventually brought to drainage connection with the Sutro tunnel through the Gold Hill mines. The advancement of the main tunnel itself, westward beneath Mount Davidson, has been under special consideration, awaiting a revival of prosperity to bring it about.

The chief objects in the construction of the Sutro tunnel were the drainage, ventilation, and facilities for the more effective working of the Comstock lode, for which service all the mining companies along the lode agreed to pay \$2 per ton royalty on all ores extracted by them worth \$40 or more per ton, and \$1 on all ores of less than that amount in value. This brought in a royal revenue in the bonanza days, but in the later years of adversity, in 1890, the tunnel company reduced the royalty to 4 per cent of the coin value of the gold and silver bullion yield of the mines. The mining companies found it more expedient and advantageous to hoist their ore to the surface through their own shafts and ship it 15 or 20 miles by railroad to the mills on Carson River, paying the royalty all the same.

NEW SUTRO MILLING ENTERPRISE.

The lateral branches of the Sutro tunnel, skirting along the eastern borders of the Comstock, passed through large amounts of very low-grade ore, considered mere waste or of no value whatever by the mining companies. This material constitutes a very considerable portion of the immense waste dump at the mouth of the tunnel, and recently, numerous assays and tests indicating it to have a gold and silver assay value of about \$3 per ton, Mr. Franklin Leonard, president of the tunnel company, concluded to experimentally take advantage of the cheap facilities for working it.

A first-class 10-stamp mill from the Risdon Iron Works, San Francisco, was accordingly erected 600 feet from the mouth of the tunnel and just below the dump, utilizing the liberal stream flowing from the Comstock through the tunnel as water power. The ore is shoveled into cars that run it directly into the mill, so that the cost of handling being a mere trifle and the power nothing, that waste stuff pays a good little profit. The mill works to perfection, reducing 60 tons a day, 6 tons to the stamp. Plenty in the dump, plenty more where it came from, and the mill can be easily enlarged if considered advisable at any time. In running the main tunnel about four or five good-sized ledges of low-grade ore, principally gold, were passed through lying east of and parallel with the Comstock, which may some day be found worth working.



THE GOULD & CURRY NEW MILL.

Near the mouth of the lower tunnel, through which the ore from the old upper workings of the mines passes in cars about 3,000 feet directly into the mill. It has nine Kinkead gyratory crushers or grinders, with amalgamating plates, concentrators, etc.; wet process. Daily reduction capacity 100 tons. Virginia City and Mount Davidson in the distance.

SOME INTERESTING COMSTOCK FIGURES.

A careful and appreciative study of the subjoined up-to-date tabular statement, "A," will be of peculiar interest to stockholders and speculators as giving a good insight to the financial management of the Comstock mines. It indicates considerably who paid the most assessments and who got the best returns in dividends, also the poorest-paying mines for the assessments invested. It also gives a comprehensive list of the regular main-range mines of the Comstock adjoining each other in order of succession, commencing at the north end and proceeding southward through Virginia and Gold Hill to Silver City.

The excess of dividends over assessments in the summing up substantially refutes a reckless assertion sometimes heard that more money has been put into the Comstock than ever was taken out of it, "Cost more than it come to," etc.

A.—FORTY YEARS' ASSESSMENTS AND DIVIDENDS.

Name of mine.	Number of feet.	Total amount of assessments.	Total amount of dividends.
Utah Consolidated	1,500	\$505,000	-----
Sierra Nevada	4,400	6,800,910	\$102,500
Union Consolidated	1,000	2,690,000	-----
Ophir	675	4,773,448	1,592,800
Mexican	600	2,314,190	-----
Consolidated California and Virginia	1,310	3,443,100	84,170,000
Best and Belcher	540	2,691,483	-----
Gould and Curry	612	4,737,050	3,837,600
Savage	771	7,354,600	4,460,000
Hale and Norcross	400	5,730,880	1,850,000
Chollar	700	2,126,000	750,000
Potosi	700	2,225,520	-----
Bullion	943	3,136,000	-----
Alpha	306	322,350	-----
Exchequer	400	1,023,000	-----
Imperial Consolidated	468	2,291,000	500,000
Challenge Consolidated (including Bowers and next adjoining small mines)	150	447,500	4,800,000
Confidence	130	558,796	204,490
Yellow Jacket	1,200	5,866,000	2,184,000
Kentuck	90	128,450	1,350,000
Crown Point	641	3,010,000	11,903,000
Belcher	1,040	3,606,600	15,397,200
Segregated Belcher	1,324	384,000	-----
Overman	1,200	34,460	-----
Caledonia	2,188	3,240,000	-----
Justice	2,100	3,688,250	-----
Alta	600	3,696,310	-----
Silver Hill	1,200	2,220,200	-----
Total	-----	79,045,097	133,101,590

Excess of dividends over assessments, \$54,056,493.

SUSTAINING POWER OF THE ASSESSMENT SYSTEM.

The regular assessments levied upon the nonpaying mines were paid with the utmost facility by the market itself, delinquent assessments being immediately added to the price of the stock, fortune-blinded dealers hardly knowing or caring how it was done or who paid it, and it is to this recklessness of stock speculation that many of their mines owe their very existence to-day. All but the rich bonanza group of Virginia and Gold Hill would have passed into obscurity and the broad grave of buried hopes in the sweet long ago.

A good instance is that of the Bullion mine, conspicuously located right in the middle of the big lode, on the municipal line between

Virginia and Gold Hill, which persistently belied its name by never producing any bullion whatever. Yet it was actively worked and explored for over thirty years, at a cost of more than \$3,000,000, paid by assessments levied upon the pockets of the stock-gambling public, whose only knowledge of the Bullion mine was its auspicious name and location.

So, also, through the sustaining power of stock speculation, the miners were always assured of their regular wages whether the mines produced anything or not. Their union fixed the rate of wages at \$4 a day, and in the earlier and more flourishing times, with 3,000 or more miners employed, the monthly pay roll averaged between \$300,000 and \$400,000 a month. Only about 300 miners are now employed, with a pay roll of \$36,000 per month; last year, the most poverty stricken, it was less, yet the \$4 wage rate, higher than anywhere else, is still arbitrarily maintained.

But Comstock mining matters are decidedly improving, and better times are already perceptible with renewed advancement. Even the stock market spasmodically tries to revive and respond, for the fascinating gamble will still have its votaries as long as grounds for hope exist of finding other rich bonanzas in the mutilated and water-logged remains of the old Comstock.

PROSPECTIVE DIVIDENDS.

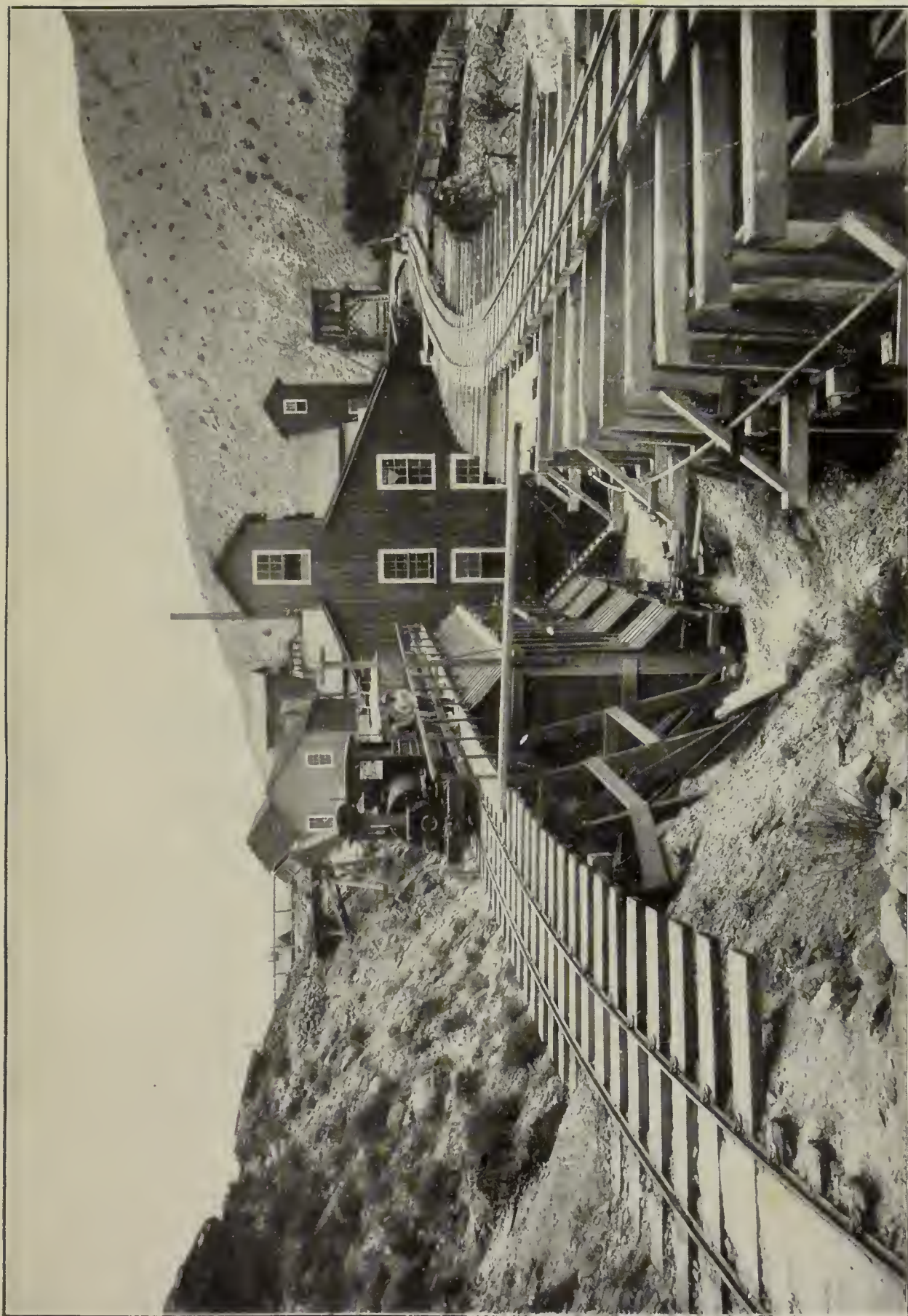
No dividends have been paid by any of the mining companies for six years past, but owing to the rich and increasing ore extraction and consequent financial prosperity of the Consolidated California and Virginia Mining Company during the year, and what is now in sight, three monthly dividends of 10 cents per share each are officially promised to be paid during the first portion of 1901, amounting to \$21,600 each, or a total of \$64,800.

This does not grandly compare with the old-time dividends of the same company, but it is pretty good and encouraging under present circumstances and conditions. Moreover, it proceeds mostly from the steadily maintained output of good ore extracted from the 1,850 to the 2,150 levels, 300 feet, so many years submerged and unavailable.

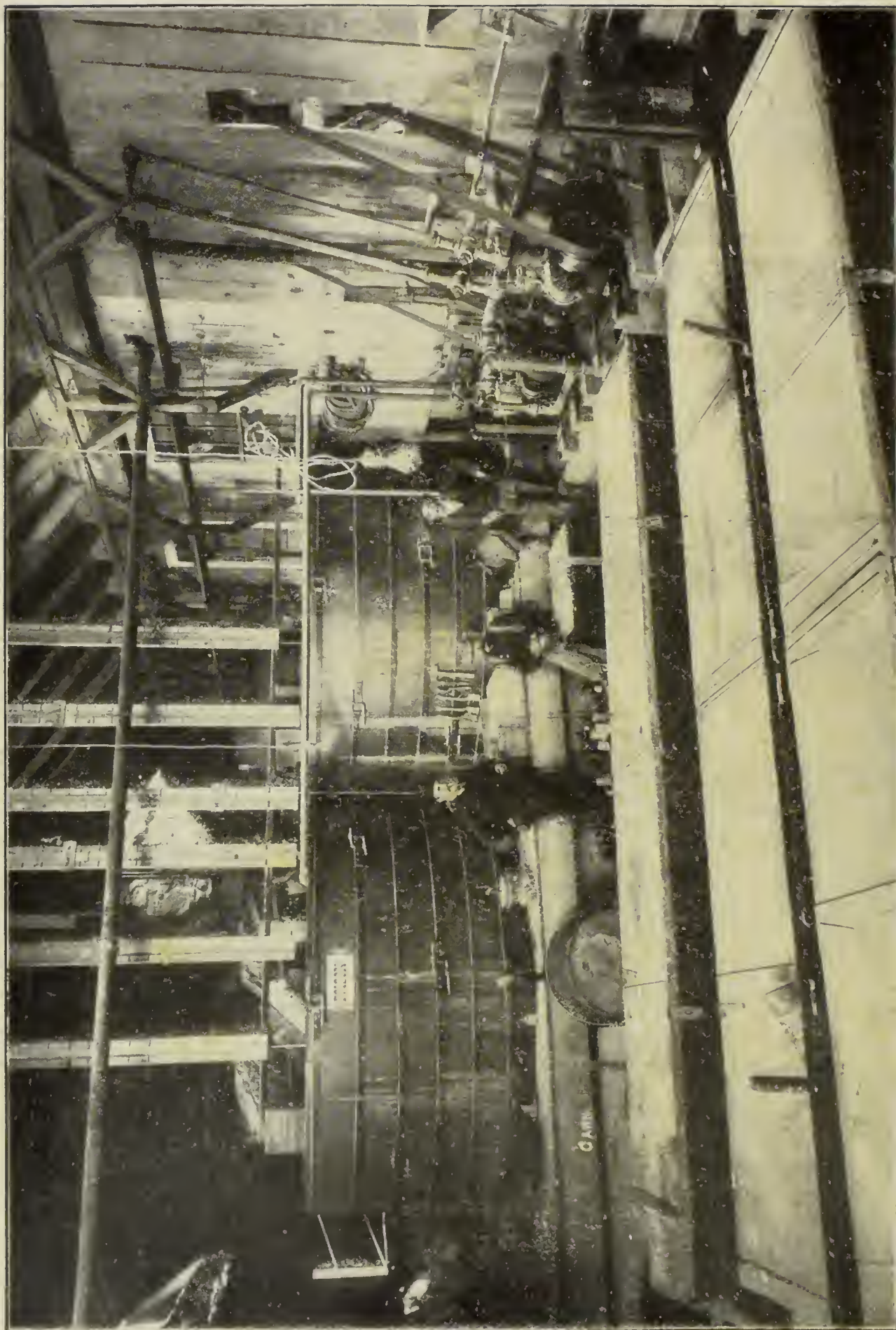
Since the new hydraulic pumping plant was started into operation at the 1,750-foot station of the shaft nearly two years ago, the water has been steadily reduced and held as required in the reopening of those old levels, thus promoting the production of over \$600,000, with good prospects in sight for even better results. It certainly is a good practical answer to the chronic controversy as to whether it would pay to drain those long submerged lower levels and resume deep explorations.

CYANIDE PROCESS ON MILL TAILINGS.

The Eureka Cyanide plant, belonging to the Comstock Mill and Mining Company, is situated on the west bank of Carson River, just within the border of Lyon County, about 9 miles below Carson City, on the site of the old Eureka mill of 60 stamps, destroyed by fire ten years ago. The company owns the Morgan mill, 5 miles above, one of the chief ore-reduction plants on the river, and they also have become owners by purchase of about all the other mill-tailings deposits of any value or extent along the river, from the Mexican mill, at or above Empire, down to their Eureka plant, about 6 miles, including those of the Brunswick mill, and also of the Nevada mill, at Virginia



EUREKA CYANIDE PLANT, CARSON RIVER.
General outside view.



EUREKA CYANIDE PLANT, CARSON RIVER.
Interior view of cyanide, zinc, and precipitating department

City, comprising many thousand tons, enough to keep their plant running for years.

Various parties and processes have been engaged in attempts to work the extensive deposits of Comstock tailings for many years past, but the latest and most successful proves to be the cyanide process.

This plant is most advantageously located to command the tailings situation, not only in working the old Eureka mill deposits, but all above to Empire, a small narrow-gauge railroad along the river side being utilized for that purpose. The tailings from the Nevada mill, at Virginia, are transported by the Virginia and Truckee Railroad, 14 miles, to a convenient switch dump near the river, where they are transferred by means of a chute about 200 feet down the steep hillside to the little narrow-gauge railroad mentioned.

THE EUREKA CYANIDE PLANT.

This plant has been in established operation about four years, and is now the most extensive, complete, and successful in the State. It includes all the latest, up-to-date improvements and appliances, not only in the chemical working departments, but in the mechanical moving and handling of the tailings sand itself from the time the little railroad delivers it into the dump until it has passed through the dissolving, precipitating, and other departments, and is finally turned out, despoiled of its gold and silver values to join the common sand down the river. The various departments throughout the works are electrically lighted, a dynamo being installed for the purpose, and a 20-horsepower engine stands ready for any emergency, but it is never needed. Ample power and water for all purposes is furnished by the river itself the year round, 25 men finding steady employment at good wages.

First of all the tailings or "sand" is mechanically and automatically conveyed from the railroad dump to eight leaching or dissolving vats, 25 feet in diameter by 8 feet deep, holding 150 tons each, which are then filled in with the cyanide of potassium solution, 1,200 tons at a time, thus continuously remaining subject to the chemical action for eight days, one vat being emptied every day and another filled.

The precious liquid solution drawn from the vat is piped to the tank and settlers of the zinc and precipitating rooms, and the now worthless sand is sluiced out of the vat into the river, ready for another eight days' change. As a result of this chemical treatment the gold and silver extract is deposited in the form of black mud, which is passed through filtering and washing apparatus, the quicksilver retorted out of it, and the smelting furnace runs it into bright bullion bars, ready to be added to the minted and commercial wealth of the world.

The proportion of gold and silver in this bullion is about equal, estimated on the basis of gold value. The bullion yield per ton from tailings generally runs at a very low average, yet a fair profit is realized through handling large quantities at the least possible expense, 150 tons per day by this plant during the past year yielding \$130,000—over \$10,000 per month.

MILLIONS WON OR LOST IN MILL TAILINGS.

The only other cyanide plant on the river than the Eureka is the Nevada Reduction Works, six miles below, near Dayton, at the mouth

of Gold Canyon, working both ore and tailings by the cyanide process, the ore being principally from the gold veins of Silver City, and the tailings from the river-side deposits and its own ore reduction. The two cyanide plants at Silver City and the two in Six Mile Canyon work Comstock tailings, like the ore over in Washoe Valley, near Galena Creek.

The workings of all these cyanide plants combined give an aggregate yield for the year 1900 of \$294,000, which, added to the entire yield by calendar years from the commencement as given in tabular form in last year's official report, makes the account stand as follows:

	Tons.	Gross yield or value.
To and including 1899	2,965,350	\$17,469,863.16
For the year 1900	112,750	294,000.00
Total	3,078,100	17,763,863.16

In the earliest milling reductions of Comstock ore the principal point was to secure all possible of the precious metals through the mill batteries, amalgamating pans, and settlers without much heed as to the large percentage that passed away in the tailings down the canyons toward Carson River. After a while, however, it came to be considered profitable to use blanket sluices, riffles, and other devices to catch the escaping rich sulphurets, as well as quicksilver and amalgam, and restraining dams and reservoirs were constructed at favorable points along down the two canyons and the sides of the river to catch the tailings, as well as the rich chloride slums or settlings. Winter floods at times swept away these dams and their accumulations, and from the percentages saved from the tonnage of ore worked it has been estimated that not less than \$60,000,000 was thus lost in the long, erratic bed and sand flats of Carson River. Attempts to recover some of those stray millions by dredging and otherwise have been only successful in establishing the truthfulness of the proposition, also the futility or unprofitableness of their attempted rescue.

GRAND BULLION RECORD.

The most practically comprehensive illustration of the grand gold and silver production of the Comstock lode during the 40 years since discovery, and through its fluctuating periods of wonderful bullion prosperity down to its present condition of comparative adversity, can only be appreciatively given in the reproduction of the accompanying tabular statement, B. It was originally prepared and published, under Government auspices and direction, in 1887, has been added to occasionally since, as desired, and is now again presented, carefully revised and brought up to date. It is responsibly compiled from the most correct and authentic sources possible to be found.

The statistics of the very earliest years were necessarily derived from the original locators and ore producers, corroborated and substantiated through data furnished by the first mill men, also the records of Wells, Fargo & Co.'s Express, subsequently from county assessors' records, and from the records of the mining companies themselves, thus forming the only complete, legitimate, and most substantially correct statement of the munificent precious metal yield of the Comstock lode yet compiled and published.

B.—COMSTOCK TOTAL GOLD AND SILVER PRODUCTION, FROM DISCOVERY AND COMMENCEMENT, BY CALENDAR YEARS TO DATE.

Years.	Ore (tons).	Gold.	Silver.	Total.
1859		\$30,000.00		\$30,000.00
1860	10,000	550,000.00	\$200,000.00	750,000.00
1861	140,000	2,500,000.00	1,000,000.00	3,500,000.00
1862	250,000	4,650,000.00	2,350,000.00	7,000,000.00
1863	450,000	4,940,000.00	7,460,000.00	12,400,000.00
1864	680,450	6,400,000.00	9,600,000.00	16,000,000.00
1865	430,745	6,133,488.00	9,700,232.00	15,833,720.00
1866	640,282	5,963,158.00	8,944,737.00	14,907,895.00
1867	462,176	5,495,443.20	8,243,164.80	13,738,608.00
1868	300,560	3,391,907.60	5,087,861.40	8,479,769.00
1869	279,584	2,962,231.20	4,443,346.80	7,405,578.00
1870	238,967	3,481,730.16	5,222,595.24	8,704,325.40
1871	409,718	4,009,811.46	6,149,717.19	10,249,528.65
1872	384,668	4,894,559.86	7,341,839.79	12,236,399.65
1873	448,301	8,668,793.40	13,003,187.13	21,671,980.53
1874	526,743	8,990,714.06	13,486,071.09	22,476,785.15
1875	546,425	10,330,208.62	15,495,312.92	25,825,521.54
1876	598,818	12,647,464.08	18,971,196.12	31,618,660.20
1877	562,519	14,520,614.68	21,780,922.02	36,301,536.70
1878	272,909	7,864,557.64	11,796,836.47	19,661,394.11
1879	178,276	2,801,394.33	4,202,091.49	7,003,485.82
1880	172,399	2,051,606.00	3,077,409.00	5,129,015.00
1881	76,049	430,248.00	645,372.00	1,075,620.00
1882	90,181	697,385.60	1,046,078.40	1,743,464.00
1883	125,914	802,539.54	1,203,809.29	2,006,348.83
1884	188,369	1,261,313.60	1,577,438.40	2,838,752.00
1885	226,147	1,729,531.25	1,415,071.04	3,144,602.29
1886	238,780	2,054,920.15	1,681,298.31	3,736,218.46
1887	223,682	2,481,176.85	2,030,053.78	4,511,230.63
1888	271,152	3,169,209.07	4,458,058.66	7,627,267.73
1889	286,144	2,590,973.32	3,358,949.95	5,949,923.27
1890	286,075	1,992,349.03	2,988,523.56	4,980,872.59
1891	188,647	1,380,857.02	2,071,285.53	3,452,142.55
1892	133,678	1,043,158.86	1,130,088.77	2,173,247.63
1893	109,780	1,123,262.54	748,841.70	1,872,104.24
1894	97,049	768,880.63	512,587.09	1,281,467.72
1895	63,558	548,873.68	365,915.79	914,789.47
1896	39,240	340,253.36	226,835.57	567,088.93
1897	17,850	223,808.63	149,205.76	373,014.39
1898	10,766	123,023.89	82,015.92	205,039.81
1899	6,780	103,006.74	68,671.16	171,677.90
1900	35,300	381,423.56	319,441.70	700,865.26
Total	10,698,681	146,613,877.61	203,636,062.84	350,249,940.45
Total mill tailings added				17,763,863.16
Grand total				368,013,803.61

EXPLANATORY AND SUPPLEMENTAL.

The relative proportions of gold and silver given in the foregoing table show that the first year, or few months' limited production—\$30,000—was all gold. The second year, when the first mills got in their competent ore-reduction work, silver entered largely into the bullion product, yet silver did not predominate over gold until the fifth year—1863. During the years of greatest production silver ruled the hearts of the bonanzas, about 60 per cent as against 40 per cent gold; but as those famous rich bonanzas passed away their leavings or lower grade outskirts ran into gold predominance again. This was in 1885, and gold has held chief sway ever since.

And let it also be understood that although this statement, compiled from the most authentic and legitimate sources and records obtainable, places the total bullion product at \$368,013,803.61, yet there are other figures privately recorded, or not recorded at all in the flush, high-rolling times, when bonanzas were new and frequent, and the monthly bullion output was reckoned by millions. Non-obtainable figures, but read between the lines by all old-timers conversant with the liberal, wealth-seeking methods of those halcyon

days in mining and milling manipulations, surreptitious contracts quietly let at nominal rates by company officials to favored friends, silent partners, etc., including also some very lucrative leases of choice bits of mining ground, resulting in sundry multi-millionaires on the side; all of which considerations easily put the summing up of the honest product at more than \$400,000,000; in fact, many competent judges agree in placing the squarely legitimate gold and silver yield of the Comstock lode at more than \$500,000,000.

PRESENT AND FUTURE IMPROVEMENT PROPOSITIONS.

When deepest mining explorations (3,300 feet below the surface) were finally abandoned in 1886, a return to the old upper workings above the Sutro tunnel level brought renewed prosperity for a few years, or until about 1895, when the declining annual yield fell below the million mark. Last year—1899—was the poorest of all, about \$172,000. This was owing to scarcity of paying ore in sight anywhere and a hopeful renewal of preparations for developing other and more eligible deposits. As a result the yield for the present year—1900—shows much better, looking up toward the million mark again, owing to deeper explorations and increased mining activity producing more good pay ore.

This improvement in the situation is principally due to the Consolidated California and Virginia Company unwatering some of their submerged old working levels by means of the hydraulic pump, enabling them to get at and follow a rich downward leader from their famous old bonanza above the Sutro tunnel. It still yields well from the 2,150 level, also from the other drained levels and stopes above, and as the water is still more reduced it will be followed, even though it should lead to another big bonanza. Other mines are actively exploring to a lesser but encouraging degree of success.

The several ponderous and powerful hoisting and pumping steam machinery plants of the chief mining companies, originally costing \$500,000, \$750,000, or more apiece, have become old, obsolete, dismantled, sold, and electric, up-to-date machinery of greater power and efficiency is being substituted and installed in their place at comparatively a mere trifle of their original cost. For instance, the electric-hoist plant of the Union Consolidated mine cost only about \$10,000; Yellow Jacket, and Belcher, \$12,000 each, and that at the C. & C. shaft of the Consolidated California and Virginia, the most productive mine of the lode, \$16,000. The powerful hydraulic pump at the 1,750 station of this shaft is soon to be superseded by an electric "elevator" of much greater power and efficiency, followed later on by others at advantageous points along the lode.

ELECTRICITY SUPPLANTS STEAM IN COMSTOCK MINING.

The following summarized details of progressive operations incidental to the introduction and practical application of electric power in the present and future workings of the mines of the Comstock lode are substantially obtained from Leon M. Hall, consulting engineer of the Truckee River General Electric Company, who personally superintends the furnishing, under contract, of the aforesaid power generated by their great plant at Floriston, on the Truckee River, 23 miles above Reno and 33 miles from Virginia City, the installment of the machinery, etc.:

Sierra Nevada mine (old shaft).—One 20-horsepower, variable speed motor on electric hoist. Works and mine lighted with incandescent lamps.

Union Consolidated shaft.—One 100-horsepower variable speed motor, with balanced electric hoist. Rope or cable, speed 750 feet per minute, not yet in running operation. One 50-horsepower constant speed motor, driving a No. 4 Burleigh air compressor; one 50-horsepower constant speed motor, driving saws. Works lighted with arc and incandescent lamps.

Ophir mine.—One 3-horsepower constant speed motor, driving fan in central tunnel; one 5-horsepower constant speed motor, driving fan in 1,750 level mine. Works and residence of the superintendent lighted with incandescent lamps.

Consolidated, California and Virginia Company, C. & C. shaft.—One 200-horsepower variable speed motor on balanced electric hoist; rope speed 1,250 feet per minute, not yet running. One 100-horsepower constant speed motor, driving single stage Rand & Waring air compressor. Five constant speed motors, 30, 15, 10, 10, and 10 horsepower, respectively, driving saws, machine tools, and rock-breakers; also a fan in the 1,850 level and another on the 1,950 level. Mine, office, residence, and works fully lighted with arc and incandescent lights.

Best & Belcher, Savage, and Gould & Curry mines.—Operating, jointly, a 5-horsepower motor, driving fan in Curry mine tunnel. The three mines lighted throughout with incandescent lamps.

Gould & Curry mill.—Three 20-horsepower constant speed motors, driving nine Kinkead gyratory grinders and a rock breaker. Three 5-horsepower constant speed motors, driving ore concentrators. Mill lighted with incandescent lamps.

Chollar and Potosi.—One 30 and one 5 horsepower constant-speed motors, respectively, driving saws and a fan in upper tunnel. Mine and works lighted with incandescent lamps.

Hale & Norcross.—Fifteen horsepower constant-speed motor, driving fan in the H. & N. tunnel. Tunnel and works lighted with incandescent lamps.

Yellow Jacket.—One 75-horsepower variable-speed motor on balanced electric hoist; rope speed, 600 feet per minute. One 75-horsepower constant-speed motor, driving duplex tandem compound Rix air compressor; one 30 and one 10 horsepower constant-speed motors, driving saws and machine tools. Works well lighted with arc and incandescent lamps.

Belcher.—One 75-horsepower variable-speed motor on balanced electric hoist; rope speed, 600 feet per minute. One 30 and a 1 horsepower constant-speed motor, respectively, driving saws and a fan in the blacksmith shop. Works fully lighted throughout with arc and incandescent lamps.

Taylor's Mill, Silver City.—Huntington crusher, 35 tons daily capacity. One 50-horsepower constant-speed motor. Mill electrically lighted.

Jackson's Mill, Silver City.—Ten stamps, old style; 25 tons daily capacity; 30-horsepower constant-speed motor. Fitted to work both ore and mill tailings by cyanide process.

Virginia City, Gold Hill, and Silver City.—All three lighted from Floriston circuit. Telephone circuit from substation at Virginia to the Gould & Curry Mill, Yellow Jacket and Belcher mines; also connects with power house at Floriston.

RELATIVE COST OF ELECTRIC AND STEAM POWER.

The cost of power furnished as per contract with the Truckee River General Electric Company is \$7 per horsepower, based upon a continuous service and a two-minute peak load. In cases of such continuous service this shows an actual saving of 200 per cent. That is, the former rate for steam power was never less than \$21 per horsepower. By way of illustration, the Consolidated California and Virginia air compressor is using 96 horsepower, at \$7, amounting to \$672 per month; former cost was about \$1,700 per month. The Yellow Jacket air compressor is using 80 horsepower, at \$7, amounting to \$560 per month; former cost for the same service was \$1,500 per month.

These former costs were for wood and water to generate steam, cost of repairs to boilers, etc. It will be seen, therefore, that while the mining companies are paying for 1,000 horsepower, the cost upon this basis is much less than the mines could be run for by steam. When the pumping is done by electric power the cost will be much reduced, with higher working efficiency than the hydraulic pump or elevator now in use and more than equalize the rate paid per horsepower.

THE GREAT ELECTRIC PLANT ON TRUCKEE RIVER.

The company's great power plant at Floriston consists of 8,600 feet of flume, $6\frac{1}{2}$ feet deep and 10 feet wide, of capacity to deliver 300 cubic feet of water per second; two wooden stovepipe lines, 6 feet in diameter, from head gates to wheel casings; two 54-inch McCormick turbine water wheels; two kilowatt^a Westinghouse generators; six 300-kilowatt transformers, from 400 to 2,400 volts, and the necessary exciter wheels, switches, and lightning arresters.

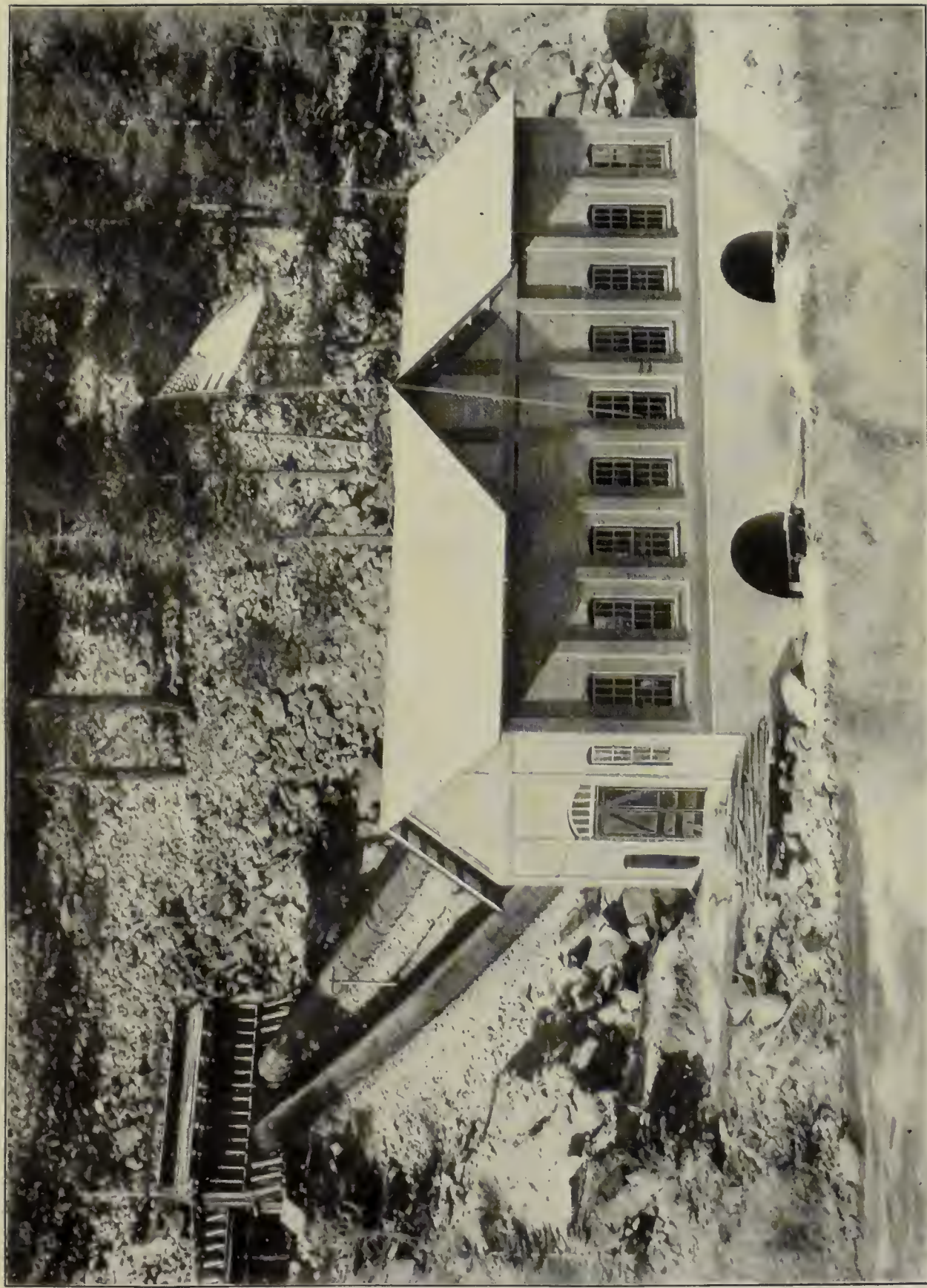
The conducting line from Floriston to Virginia City, 33 miles, consists of a double 6-wire circuit of No. 4 hard-drawn copper wire, $\frac{1}{4}$ -inch in diameter, on glass insulators and 35-foot redwood poles.

The substation at Virginia City is supplied with six 220-kilowatt transformers, 24,000 to 2,300 volts reduction, with requisite switches and lightning arresters. The distribution circuit consists of weather-proof copper wire carried to each of the mining works that are equipped with electric machinery.

DIFFERENCE IN EXPENSE AND PRACTICAL EFFICIENCY.

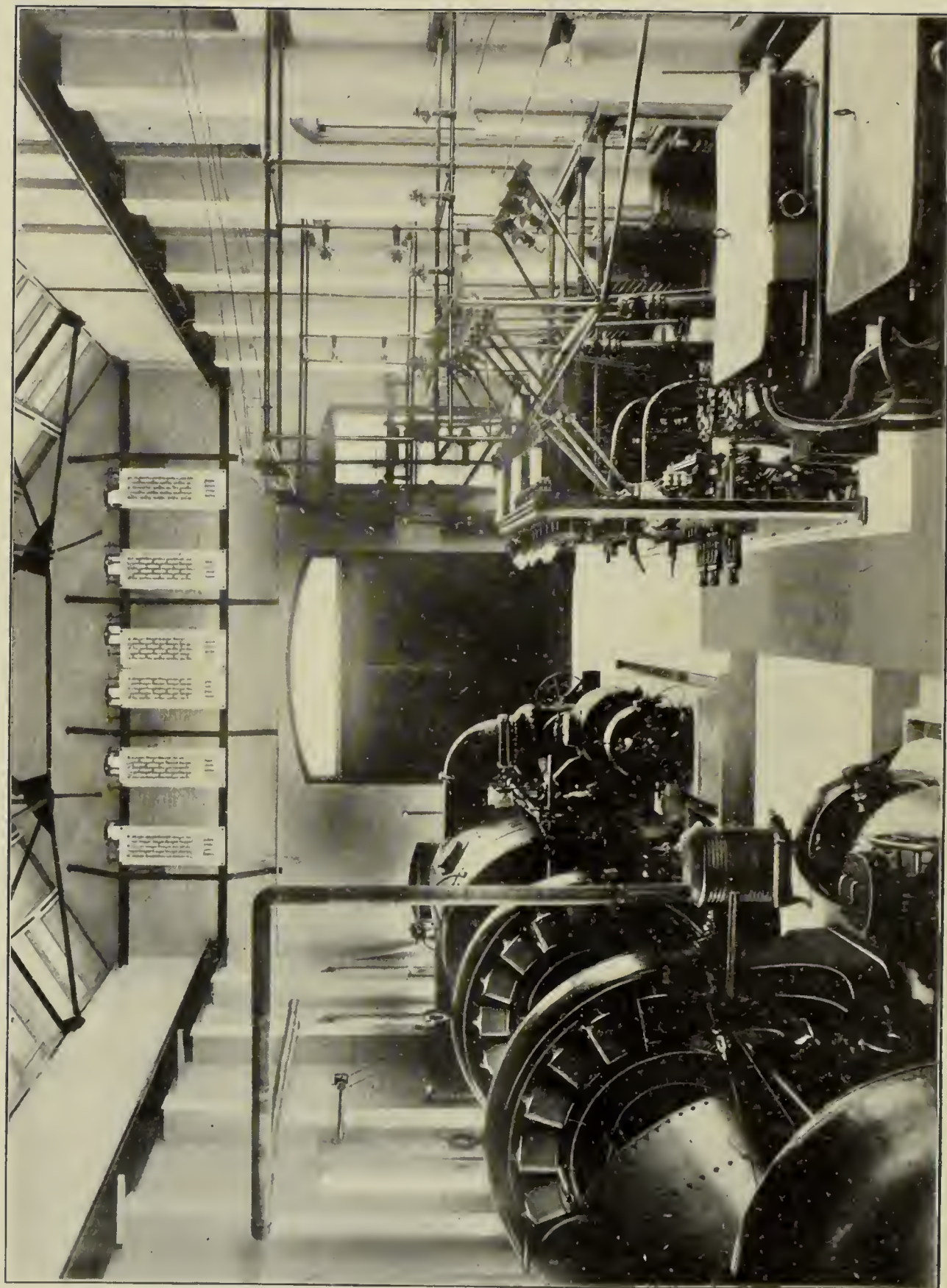
This only partially completed electric service since installation has been continuous and satisfactory in every possible way, and in no case has a return or resort to steam power been even thought of or considered for a moment. The installation of electric pumps in the C. & C. shaft and also in the Gold Hill mines is under contemplation; also electric hoisting apparatus at the Forman shaft. The hydraulic pump in the C. & C. shaft has unwatered that mine from the 1,750-foot, or pump station, to a point 30 feet below the 2,150-foot level station, discharging at times over 5,000 gallons a minute out through the drain boxes of the Sutro Tunnel. After the electric pump is installed at the 2,150-foot station the water will be reduced to the 2,500-foot station, 2,500 feet below the surface, in order to get at some streaks or deposits of good ore submerged in that part of the mine; also enabling adjoining mines drained by it to resume deeper explorations.

^a Watt, unit of electric power; kilo, 1,000 units.



ELECTRIC POWER HOUSE, TRUCKEE RIVER.

Supplanting steam power in working the Comstock mines, 33 miles distant. General outside view of the plant.



ELECTRIC POWER HOUSE, TRUCKEE RIVER.
Interior view of the plant, showing generators, excitors, transformers, etc.

ELECTRIC WORKING SUCCESS.

The first practical working introduction of this electric power to the Comstock lode was on October 20, at the new ore-reduction mill of the Gould & Curry Mining Company, constructed at the mouth of their lower tunnel. It operated very satisfactorily for nearly two months, running on low-grade ore, when milling was suspended for certain repairs and alterations found necessary to the tunnel, giving better facilities for more extensive ore extraction.

The Yellow Jacket shaft electric hoist, duly installed and successfully running, has a capacity of 500 tons per day from the 1,200-foot level, at a cost of \$560 per month for power. The same service with steam formerly cost \$3,000 per month. This hoist now makes the trip from the 1,200-foot level with double-deck cage, laden with 3,200 pounds of rock, in exactly two minutes. The balanced or tail-rope system is used, which method assures the aforesaid remarkable capacity with a 75-horsepower motor. This hoist is just as reliable as steam and is much more convenient and easily handled.

The Union, C. & C., and Best & Belcher shaft hoists, now under construction, will soon be completed, making their new Comstock second in extended facilities for important mine explorations and ore and bullion production.

PRESENT CONCLUSIONS AND FUTURE PROSPECTS.

There is practically no limit to the electric-power supply and the great Comstock ore channel is wide, deep, and unlimited in its ore possibilities. When the old steam machinery plants of the producing section shall be completely done away with and superseded by the new electric power, with the long-submerged lower levels easily drained and kept drained, mining and operating expenses reduced to proper conformity with the resources and the times, hundreds more miners will find steady employment developing old and newly found deposits of good paying ore, and a healthy era of renewed prosperity will come to the Comstock lode.

NEW MEXICO.

By J. L. HODGES,

Assayer in Charge, United States Mint, Denver, Colo.

The mining industry of New Mexico is attracting renewed attention, after a depression of some years, due to several causes.

The low price of silver since the repeal of the purchasing clause of the Sherman Act made large areas of low-grade silver ores unprofitable of operation, the more so that the experimental treatment stage had not been passed and railroad facilities were conspicuous in their absence.

LAND GRANTS.

The old land grants, within whose boundaries are included some of the important mining districts, found their exact lines and titles subjects of dispute and litigation, and being unable to pass unquestioned title to operators, mining claims thereon were unattractive and the work desultory to a degree. But decisions of the highest courts having definitely affirmed official surveys of these great grants, absolutely unassailable property rights to claims thereon are now guaranteed and Federal titles granted to locations complying with the requirements of the land offices on those portions of the grant found to be proper part of the Government domain.

The land-grant companies since these decisions are offering liberal inducements to bona fide prospectors and organized capital, as is evidenced by the important mining operations in the way of production or development upon these tracts during the past year.

RAILWAY NECESSITIES.

To some extent railway interest in the Territory's mining future has been stimulated and spurs and equipment long needed supplied or promised; but much construction of this character will be required ere the various camps even approximate their possible output.

THE INEVITABLE PROMOTER.

An intelligent exploitation of ore bodies has been sadly lacking in many sections, and dismantled and decaying mills and smelting plants emphasize the proverbial credulity of early investors, which found harvest in New Mexico, as in better known mining centers, under the tutelage of evanescent promoters.

It is agreeable to note that this distressing though apparently inevitable phase has about run its course in New Mexico. Competent mining engineers and metallurgists are in the field, and the able corps of Territorial officers, by word and pamphlet, are extending valuable counsel to inquiring capitalists.

LOGICAL EXPENDITURES.

Large amounts have been expended throughout the Territory during 1900 in the erection of plants whose adaptability to the ore bodies has been positively demonstrated, and piping enterprises on extensive scale have brought new life to mining acreage formerly abandoned because of scant or total absence of water supply. Much remains to be done in this line.

FROM COLORADO SOUTH.

The conspicuous position of Colorado in the mining world has also materially militated against the mining advance of its southern neighbor, but, with the passage of sensational discoveries in the Centennial State, its overflow of prospectors and capital, together with Eastern money for investment, have discovered New Mexico an inviting field of exploitation.

BRIGHT FUTURE IN COPPER.

In copper perhaps the future of this Territory is brightest. Important zones of copper-bearing ores are being intelligently developed by comprehensive modern systems, and the heavy expenditures for machinery, etc., in these copper regions guarantee earnest and sustained efforts toward its production. The smelters at El Paso and Silver City are found convenient points of market, while Pueblo and Eastern plants receive a quota.

BERNALILLO COUNTY.

Bland is the commercial center of the Cochiti district and is reached by stage from Thornton, a point on the main line of the Santa Fe Railway, 18 miles distant. A large electric plant has been completed at Madrid, in Santa Fe County, to supply power and light to the Bland district.

The Cochiti Mining Company has been the principal operator during the year. The Lone Star has a vein of good sulphides running perpendicularly up the mountain and will erect a new mill of large capacity.

The Albemarle, 3 miles from Bland, across the mountain, has operated extensively.

During the year the Washington has been in litigation.

The Crow Plant is a promising property, and a number of others augur well with improved facilities for operation.

The Woodbury mill, destroyed by fire, has been replaced by a modern cyanide plant of 10 tanks.

This district of Cochiti embraces a great low-grade area and is especially alluring to seasoned operators. It has passed the experimental stage, and cyanide and other plants will shortly prove abundantly able to encourage the tonnage.

The great drawback to the camp's advance is water scarcity and delay of the Santa Fe Railroad in building to the district. A custom mill is imperatively needed at some convenient point on the Rio Grande River, at a possible distance of 12 or 15 miles.

Desultory work has been done at other Bernalillo County districts—Hell Canyon, Coyote Canyon, and Las Placitas.

Good copper deposits exist at Copper City and San Isidro, but their distance from railroad discourages operators. Abundant capital could work them profitably.

DONNA ANA COUNTY.

The Torpedo is in good copper ore, and the Excelsior has produced somewhat.

The Modoc outputs considerable lead.

Bear Canyon mines have shown good bodies of lead and copper ore.

The San Andreas high-grade copper deposits have been shipped to El Paso.

GRANT COUNTY.

Grant County is still the banner mining county of the Territory.

The Pinos Altos Gold Mining Company's properties have worked steadily, the output reaching a valuation of \$267,532.43. This company is owned and financed by the Hearst estate, of California. It has expended a large amount of money in perfecting its milling plants and establishing a pipe line some 8 miles long, which conveys an adequate supply of water from Gebhardt Springs.

The Pinos Altos ores from vein surface were oxidized, free-milling, but at depth the sulphuretted ores were encountered, which offered serious obstacles to the gold amalgamation for a period. Improved processes were installed and the ores are now treated by amalgamation and concentration of tailings, the concentrates going to smelter at Silver City, which on February 15, 1900, passed under the control of the American Smelting and Refining Company.

The Hearst properties were the only important producers of the year, although some development was done by other parties. The deepest shaft in the district is about 1,000 feet. The ore body is continuous, although the vein varies from several inches to 4 and 5 feet in width, the gold value averaging about an ounce to the ton.

The large Hearst mill is equipped with modern machinery and complete detail.

OTHER GRANT COUNTY DISTRICTS.

In the Hanover district the Modoc, Humboldt, and Hanover properties are copper producers. Important iron shipments are made by the Colorado Fuel and Iron Company.

SANTA RITA COPPER MINES.

The copper mines at Santa Rita show signal improvement. The area of copper ground is fully a mile square, the ore averaging 20 per cent copper, and portions were worked by the Spaniards from the early part of last century. Old dumps at the mines cover hundreds of acres, indicating extent of operations. A large plant is in course of erection.

At Central a concentrating mill nears completion. The ores carry lead, silver, and gold.

At Chloride Flat and Alhambra the silver mines are not working.

Lead ore of good grade has been shipped from Victoria.

At Steins Pass, Volcano, Granite Gap, and Hachita little was done during the year on the lead-silver properties.

Some gold was produced at Gold Hill and copper at Paschal. Considerable low grade awaits the introduction of proper plants for treatment.

Silver City is the chief distributing point for Grant County. It is a thriving, well-built town, at an elevation of 6,021 feet.

LINCOLN COUNTY.

The mineral belt of Lincoln County extends from Gallinas Mountain on the north to White Mountain on south—over 80 miles. The absence of railroads has militated severely against the mining industry of the county until recently, but the extension of the El Paso North-eastern Railroad has proven a wonderful stimulus, and other projected construction will materially benefit the county.

The Old Abe, of White Oaks district, is the principal gold producer. Its main shaft is beyond 1,200 feet, and dry. An ample cyanide plant handles the mill tailings.

An encouraging strike of good mineral was recorded by the Com-promise.

The Homestake shafts are good and the workings profitable. Among promising properties are the Rip Van Winkle, Little Mack, and Lady Godiva.

Copper discoveries with excellent indications were made during the year.

Large tracts of coal and iron have been taken up during the year by the Bethlehem Iron Company and other well-known concerns.

JICARILLO PLACERS.

The Jicarillo placers, 12 miles northeast of White Oaks, have suffered from limited supply of water, but the American Placer Company, which has acquired them, is arranging for an adequate flow, probably from the Capitan Mountains. This placer gold is coarse and of high grade.

In the Gallinas Mountains are prospects carrying copper sulphides and carbonates, also lead carbonates and galena. Their great distance from shipping point would entail unusual expense and has almost prohibited production.

Much low grade distinguishes the Nogal district.

SANTA FE COUNTY.

The smelter at Cerrillos at close of the year was preparing to start up. The Woodworth mill, near Golden, has been completed.

At San Pedro the copper smelter is working and the Santa Fe copper properties looking well.

Gold in fair quantity was washed and mined from the San Pedro and Golden districts during the year.

EDISON ELECTRIC PLACER SYSTEM.

The Edison Company has operated an experimental plant at Dolores for some months, treating the dry placer gravel and sand electrically, but to what extent, if any, values have been extracted remains a profound secret, although it is confidently asserted that this company is about to erect a plant of heavy capacity on the ground.

Near Cerrillos silver-bearing lead and zinc ore are receiving attention, and the Tiffany turquoise mines have yielded heavily; the product is of excellent quality. The O'Neill turquoise property has also produced, when worked, in fair measure.

SIERRA COUNTY.

The Hillsboro district has experienced an active twelve month. The Philadelphia Milling and Mining Company, under which are grouped the W. H. Andrews properties, producing steadily, notably the Trippe.

The Porter properties have also shown excellently, and been considerably developed.

Amalgamation and concentration are the ruling processes of this district.

SOCORRO COUNTY.

Some work occurred in the Mogollon district, notably the production of the Helen, while the W. H. Martin property, and others, at Rosedale, yielded gold in profitable quantity. The ore is free milling, and tailings are concentrated.

Magdalena's silver-lead mines have been comparatively quiet.

The old Graphic mine, in the Kelly district, has yielded, not largely, some lead carbonates and galena.

County.	Gold.	Silver.	Total value.	Lead.	Copper.
	Value.	Coinage value.		Commercial value.	Commercial value.
Bernalillo.....	\$218,259	\$140,876	\$359,135		\$814
Colfax.....	32,277	2,116	34,393		498
Donna Ana.....	2,873	8,426	11,299	\$7,649	118,612
Grant.....	413,704	298,926	712,630	159,076	1,083,340
Eddy.....	289	699	988	274	13,661
Santa Fe.....	2,593	29	2,622		
Socorro.....	45,549	63,960	109,509	28,252	135,054
Sierra.....	37,991	143,373	181,364	111,178	10,782
Lincoln.....	72,183	603	72,786	139	1,354
Unknown.....	58,370	25,752	84,122		
Total.....	884,088	684,760	1,568,848	306,568	1,364,115

SOURCE OF PRODUCT.

Gold:		Fine ounces.
From quartz.....		39,140
From placer.....		3,638
Total.....		42,768
Silver:		
From quartz.....		139,619
From lead ores.....		90,000
From copper ores.....		300,000
Total.....		529,619

OREGON.

By FREDERICK A. WING,

Assayer in charge United States assay office, Seattle, Wash.

The values of the gold, silver, copper, and lead produced in the State of Oregon during the year 1900 amounted to \$1,906,175.41.

PRODUCTION OF PRECIOUS METALS IN THE STATE OF OREGON DURING THE YEAR 1900.

Metal.	Quantity.	Value.
Gold.....fine ounces..	83,586.781	\$1,727,892.11
Silver.....do.....	132,042.07	^a 170,721.06
Copper, at \$16.19 per cwt.....fine pounds..	21,101	3,416.25
Lead, at \$4.37 per cwt.....do.....	94,874	4,145.99
Total		1,906,175.41

^a Coinage value.

A reference to the appended table shows the net increase to be \$239,402.94 over the production of 1899.

PRODUCTION OF PRECIOUS METALS IN OREGON DURING YEAR 1900 COMPARED WITH THAT OF 1899.

Metal.	1899.		1900.	
	Quantity.	Value.	Quantity.	Value.
Gold.....fine ounces..	70,984.436	\$1,467,378.52	83,586.781	\$1,727,892.11
Silver.....do.....	145,353.51	187,931.80	132,042.07	170,721.06
Copper.....fine pounds..	43,178	7,603.65	21,101	3,416.25
Lead.....do.....	86,320	3,858.50	94,874	4,145.99
Total		1,666,772.47		1,906,175.41
Net increase				239,402.94

Owing to the failure of the mine owners and operators in many instances to answer interrogatories sent them regarding the production and general development of their properties, it is impossible for me to classify, by counties, the output of the State.

The counties known to be contributing materially to the State's production are Baker, Grant, Union, Malheur, Wallowa, and Wheeler, in the northeast, and Josephine, Jackson, Coos, Curry, Douglas, and Lane, in the southwest. Baker County enjoys the distinction of being the largest gold-producing county in the State, Grant County the largest lead and silver, and Josephine the largest copper-producing county.

BAKER COUNTY.

Sumpter easily holds the proud distinction of being the leading mining center of Oregon. With its valuable placer mines within the city limits and its many surrounding hills constantly yielding to the prac-

tical and energetic mine owner their treasures, much of the State's output comes from within a radius of a few miles of the thriving little city of Sumpter itself. Directly north, hidden only by the lofty hill-tops, and almost within hailing distance, are the mills of the North Pole, E and E, Columbia, and Golconda, all busily pounding away with their many stamps at a ledge that seems almost inexhaustible in its width and of great depth. In many places the workings are now down hundreds of feet, thoroughly establishing the fact that the veins continue far below. In all directions new properties are being prospected, and there is a general appearance of thrift on all sides.

Extension of both rail and wagon roads are being pushed forward into the adjoining districts of Granite and Bonanza to the west, and on to the Quartzburg district still farther south and west, opening up a country rich in mineral wealth and timber.

The mines in this county reporting their production for 1900 are the French Gulch Placer mine and the Sam Long Placer mine, both in Auburn district; the Gold Ridge mine, near Express; Eagle group of mines, in the Cable Cove district (lead producers); Chicken Creek Placer mines, in Chicken Creek district; Flick Bar Placer mine, in Baker district; the Clarke Creek Placer mine, in Bridgeport district; Baisley-Elkhorn mine, in the Baisley-Elkhorn district; the North Pole mine, in the Cracker Creek district, and the Mammoth mine, in the Ibex district. Besides these there are many other mines that are known to be producers, such as the Virtue Consolidated, Mormon Boy, Consolidated Virginia, Never Sweat, Rye Valley Placer, and the Columbia mine.

The Columbia mine, near Sumpter, is one of the largest producers in the State, being developed to a depth of 1,050 feet, and at the 500-foot level there is a pumping station with a capacity of 800 gallons per minute. The mine is furnished with the necessary water power, has 2 drill air compressors, one 20-stamp mill, sinking machinery capable of a depth of 1,350 feet, and 17 concentrators for reducing the ores.

GRANT COUNTY.

The following mines reported as producing in 1900: Caledonia mine, Pyz mine, Humboldt mine, in Big Creek district; Elk Creek mines, Susanville district; Quartz Gulch mine, Marysville district; Bald Mountain mine, in the Ibex district; this mine has a 20-stamp mill in operation; Black Butte mine and the Red Boy, in the Granite district. The Red Boy mine is one of the best-equipped mines in the State. It is developed to the 500-foot level, and, including the workings of the old mine, has nearly 8,000 feet of tunneling and crosscutting. The mine is furnished with a 20-stamp mill, electric-light plant, and cyaniding plant for treating concentrates. Sinking machinery of a capacity of 3,000 feet depth was installed during the past year. The total amount invested to date in machinery and buildings approximates over \$200,000.

Adjoining the Red Boy on the west is the Concord, owned by Pendleton and Sumpter people, on which a great deal of development was done, over 2,000 feet of tunnels, crosscuts, etc., being completed. From present indications the prospects are very favorable for the property being one of the producers of the county in the near future. Other properties on which development work has been done during the year are the Quebec, Alamo, and Strasburg. The Badger mine, in the Susanville district, is a regular producer. The ore from this mine has to be hauled 45 miles for railroad transportation.

UNION COUNTY.

The Cornucopia mines of Oregon are situated about 85 miles north-east of Baker City, Oreg., in what is known as Granite mining district, and consist of 20 patented and 9 unpatented claims.

The principal work accomplished thus far in the way of development has been upon the Union, Companion, Red Jacket, Last Chance, and Whitman claims, aggregating a total of 20,000 feet in shafts, cross-cuts, tunnels, and drifts.

The Union, Companion, and Red Jacket claims are located on the same vein, while the Last Chance and Whitman are on parallel veins to the east and west, respectively.

The equipment of the property consists of a 20-stamp mill, with necessary amalgamating and concentrating machinery, and one 12-drill and one 6-drill air compressors and two hoisting engines, all of which machinery is driven by electricity, the initial power being water taken from Pine Creek and used under a 310-foot head, furnishing 450 horsepower, the power being transmitted 2 miles to the mines.

The property has been worked, with a few intermissions, very successfully for the last six years, and the recent developments in the deeper workings of the Union-Companion shaft would indicate a still greater prosperity for the future. The mines rank easily among the very best mining properties in the State. The ore from these mines is a quartz gangue, carrying iron pyrites and some free gold. The gross product of the mill at the present time in concentrates and bullion is about \$1,000 per day, with a reasonable probability of a still greater production in the future. Much in the way of new appliances and improved facilities has been added to the already large equipment, and the group, under the capable management of Capt. Alliene Case, together with Mr. Robert N. Jones and George D. Beatty, acting for the Searles estate, owners, is rapidly assuming the position their magnitude and importance entitles them to hold among the wealth-producing mines of the State.

The producing mines in this county reporting their output are the Treadwell and Flying Dutchman, the Grande Ronde Mining Company's properties, the Carson Woody mines, both in Grande Ronde River district, and the Cornucopia mine at Cornucopia. Other producing mines in the county are the Elk Creek Mining Company's mine at Cornucopia, the Sanger Development Company at Sanger, Basin Mining Company, and the New Bridge Placer Mining Company.

MALHEUR COUNTY.

The producing mines in this county are the Malheur Placer mines, Willow Creek placer; Red, White, and Blue mine; Gold Nugget, Golden Eagle and White Chief, Eldorado Ditch Mining Company, Rich Creek mines, and Colt Brothers' mine, Basin district. The mining districts are all in the northern part of the county.

Wallowa County contributed about \$4,000 from the placers along the Snake River.

Wheeler County yielded from its placers in the Spanish Gulch district about \$15,000 during the past year.

JOSEPHINE COUNTY.

Josephine County is the principal contributor to the State's production in the southwestern portion of the State. Among the known producing mines are Dry Diggins mine, in Dry Diggins district;

Ruble Hydraulic mine, Rogue River district; Red Dog mine, Briggs Creek district; Golden Wedge Group, Golden mine, and Merrill mine, Galice district; Champion Gold Mining Company (Rising Star mine), Powell Creek placer mine, Alex. Watts mine, William district; Sailor Gulch mine, Simmons & Cameron mine, and Waldo copper mine, in Waldo mining district; Little Dandy mine, Victor Jr. Gold Mining Company (Greenback mine), and Vindicator placer mine, in Grave Creek district; the Mountain Slide placer mine, in Althouse district; the Jupiter gold mine, Gold Bug mine, Rocky Gulch mine, and Treasure Trove mine, at Grant Pass; Bauner & Hazel mines and Sanders placer mine, Wolf Creek district.

DOUGLAS AND LANE COUNTIES.

Near the central part of the Bohemia mining district, which is second to none in the State in importance, is located the Musick mine, which has long been known as the "Old Stand-By," from the fact that it has been in continuous operation for many years, and is reputed to have produced something like \$700,000 since 1892. The development of the mine consists of six levels, being run on the Musick ledge as per the general section of the Musick mine, of about 4,000 feet of tunnels and drifts. The course of the ledge at different points varies from north about 40° to 80° west, and lies almost perpendicular. It is somewhat irregular in width, ranging from 1 foot to 16 feet between walls, and has numerous branches. The ledges are made up of three parallel veins, as was best shown on level No. 3, where the ledge was 12 feet between walls. Oxidization extends to a depth of about 100 to 150 feet, although there is a small percentage of sulphides above that depth. Below the depth of 150 feet the ore changes and becomes richer in pyrites, lead, copper, and sulphides. On level No. 6 the ore is rich in galena, and in the west part of the drift is principally galena with quartz and sulphides, and contains no free gold to speak of. Some portions of the vein are principally quartz and other pyrites. At one point sphalerite is abundant and constitutes the greater portion of the ledge. The ores carrying the most lead go as high as 40 to 50 per cent. This is desirable, as a smelter will undoubtedly be located in the camp ere long. Recent developments in level No. 6 show a ledge 6 feet wide, running high in lead, 2 feet of it carrying copper, pyrites, and sulphides, values running to \$160 per ton. The group consists of the Defiance, California, White Guests, Mystery, Alpharetta, Los Angeles, and Ajax, in Douglas County, and the Butter, June, Idaho, Hazel, Yukon, and Halifax, in Lane County. In prospecting with cuts, tunnels, and shafts the California ledge has been traced for over 3,000 feet, showing free gold in many places, and with every evidence when opened up of making as good a producer as the famous Musick ledge. So confident of the future are the owners that they have about completed arrangements for the development of the mine on a more extensive basis than has ever been done in the past. A drift on level with ore bin in mill has been started, and it is the intention of the company to push this drift on the ledge to great depth, as from numerous shafts sunk on the ledge on the surface every indication is that large bodies of free-milling ore will be opened up.

This valuable mine, as well as the Helena No. 1 and Helena No. 2, are owned by Oregon capitalists, and the officers of the company are P. J. Jennings, president; Charles J. Brenau, vice-president; R. J. Jennings, secretary and treasurer, and J. J. Jennings, superintendent,

to whom I am indebted for their hearty cooperation and assistance in securing reliable data concerning the mines of southwestern Oregon.

Among the mines in these counties reporting as being producers in 1900 are the Olalla placer mine, in Olalla district; Lewis Ash placer mine and the Cains placer mines, in the Excelsior district; Coffee Creek placer mine, Coffee Creek district; Starvout and Green Mountain mines, owned by the Starvout Hydraulic Mining Company, in Green Mountain district, and the Lucky Boy, in the Blue River district.

The following gives, approximately, the amount of development work done in the way of tunneling for the year 1900 on various claims in Bohemia district: Champion mine, 400 feet; Helena, 1,000 feet, and has a 10-stamp mill and 35-horsepower steam plant; Helena No. 2, 500 feet; Vesuvius, 1,100 feet; Musick, 1,000 feet, has a 10-stamp mill and 45-horsepower steam plant; Harlow & Stocks mine, 500 feet, has a 5-stamp mill; Star mine, 1,200 feet, has a 5-stamp mill; Whale, 500 feet; Montana Gold Mining Company, 900 feet; Bohemia, 100 feet; Mayflower, 400 feet; Gold Slipper, 500 feet; Riverside, 500 feet; Shane mine, 300 feet. Besides, there are several hundred claims on which about 4,000 feet of tunneling have been run.

JACKSON COUNTY.

The mines in this county reporting as having produced in 1900 are the Lone Star mine and Sykes Creek mine, in Pleasant Creek district; Willow Springs mine, in Willow Springs district; Dandy mine, in Grave Creek district; the Scott mine, Gales Creek district; Steamboat Gravel mine, Steamboat district; Hays mine and the Sardine placer mine, Gold Hill district; Iron Mountain placer mine, Sams Creek district; Reta group of mines, Sardine district; Cook mine, Foots Creek district; Con Saxe Creek mines, Evans Creek district; Red Hill mine, Upper Grave Creek district; Lost Channel mine, Jackass Creek district; Sturgis placer mines, Forest Creek district, and Columbia mine, Gales Creek district.

COOS AND CURRY COUNTIES.

The production of these counties comes mostly from the placer mines in the Sixes mining district, Johnson mining district, Randolph and Johnson Creek mining districts. Among those contributing to the output of the State are the Pardee mine, in the Illinois district; St. Patrick and Mountain Daisy placers, in the Sixes district, and the Salmon Mountain mine, in Salmon Creek district.

PRODUCTION OF GOLD AND SILVER IN OREGON (ORIGIN DETAILED) DURING CALENDAR YEAR 1900.

Origin.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Placer bullion	15,268	\$315,617.57	3,560	\$4,602.83	\$320,220.40
Mill bullion	42,394	876,361.76	30,296	39,170.59	915,532.35
Copper ores	20	413.44	-----	-----	413.44
Lead ores	313,500	6,480.62	52,374	67,715.88	74,196.50
Dry ores and concentrates classified as smelting ores ..	25,591.281	529,018.72	45,812.07	59,231.76	588,250.48
Total	83,586.781	1,727,892.11	132,042.07	170,721.06	1,898,613.17

BULLION OF OREGON PRODUCTION DEPOSITED AT THE UNITED STATES MINTS
AND ASSAY OFFICES DURING THE CALENDAR YEAR 1900.

Institution.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coining value.	
Mints:					
Philadelphia.....	70.319	\$1,308.26	6.82	\$7.93	\$1,316.19
San Francisco.....	8,844.157	164,542.45	2,398.66	2,791.17	167,333.62
Assay offices:					
Boise.....	38,284.344	712,266.86	15,941.32	18,549.90	730,816.76
Denver.....	66.066	1,229.13	13.69	15.93	1,245.06
Helena.....	1,086.704	20,217.75	256.26	298.19	20,515.94
Seattle.....	190.822	3,550.18	58.31	67.85	3,618.03
Total.....	48,542.412	903,114.63	18,675.06	21,730.97	924,845.60

DISPOSITION OF GOLD AND SILVER OF OREGON PRODUCTION DURING THE
CALENDAR YEAR 1900.

Disposition.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Deposited at the United States mints and assay offices	43,688.170	\$903,114.63	16,807.55	\$21,730.97	\$924,845.60
Shipped to custom smelters and refineries by producers	39,898.611	824,777.48	115,234.52	148,990.09	973,767.57
Total.....	83,586.781	1,727,892.11	132,042.07	170,721.06	1,898,613.17

SOUTH APPALACHIAN STATES.

By W. S. CLANTON,

Assayer in Charge of the United States Assay Office at Charlotte, N. C.

The production of precious metals in 1900, in this section, amounted to 27,844.149 fine ounces, of coining value of \$316,033.20, against \$340,535.05 for 1899, a decrease of \$24,501.84. The comparison between the two years is shown in the following table:

TABLE 1.—SUMMARY.

State.	1899.	1900.	Increase (+) or de- crease (-).
Alabama.....	\$4,830.76	\$2,683.07	-\$2,147.69
Georgia.....	117,682.70	125,160.26	+ 7,477.56
Maryland.....	1,176.14	393.61	- 782.53
North Carolina.....	47,861.94	60,639.33	+12,777.39
South Carolina.....	160,832.25	123,162.96	-37,669.29
Tennessee.....	177.58	311.75	+ 134.17
Virginia.....	7,973.67	3,682.22	- 4,291.45
Total.....	340,535.04	316,033.20	-24,501.84

It will be observed that the decrease in Alabama, Maryland, South Carolina, and Virginia was proportionately large; in Georgia there was a slight increase; in North Carolina and Tennessee a relatively large increase, the decrease or adverse balance amounting to a trifle more than 7 per cent.

The total deposits at the various mints and assay offices of the United States, officially reported to this office, amounted to \$273,236.97, being 86½ per cent of the total yield in coining rates and nearly 89 per cent at commercial rates.

My forecast in 1899 as to an increase in the amount of shipping ores was fully verified; this increase was from the North Carolina and Virginia belt, with Virgilina, Va., as its center, and from Rowan County, N. C.

A classification according to immediate sources of production is given in Table No. 2, with a summary and comparison in Table No. 3:

TABLE 2A.—IMMEDIATE SOURCES OF PRECIOUS METALS OBTAINED IN 1900.

[Coining values.]

State.	Placers.		Mills.		Works.		River mining.	
	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.
Alabama.....	\$936.45	\$17.60	\$1,273.14	\$21.54	.....	.....	.....	.....
Georgia.....	19,659.52	135.93	67,871.81	405.01	\$20,781.60	.....	\$11,120.84	\$18.94
Maryland.....	186.05	.74	112.59	.84	.....	.....	.....	.....
North Carolina.....	17,633.15	219.20	15,922.17	384.45	.....	.....	723.65	2.27
South Carolina.....	6,324.89	78.67	59,081.16	424.89	56,862.42	.....	.....	.....
Tennessee.....	310.36	1.39	.....	.....	.....	.....	.....	.....
Virginia.....	1,934.23	19.31	1,289.48	12.87	.....	.....	.....	.....
Total.....	46,984.65	472.84	145,550.35	1,249.60	77,644.02	.....	11,844.49	21.21

TABLE 2B.—IMMEDIATE SOURCES OF PRECIOUS METALS OBTAINED IN 1900.

[Coining value.]

State.	Shipping ores.		Untraceable.		Total.		Grand total.
	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.	
Alabama.....	\$199.48	\$1.29	\$209.38	\$24.19	\$2,618.45	\$64.62	\$2,683.07
Georgia.....	893.65	10.76	4,200.45	61.75	124,527.87	632.39	125,160.26
Maryland.....	93.02	.37	.....	.....	391.66	1.95	393.61
North Carolina.....	8,527.89	15,346.55	1,846.42	33.58	44,653.28	15,986.05	60,639.33
South Carolina.....	238.23	1.98	149.95	.77	122,656.65	506.31	123,162.96
Tennessee.....	.....	.....	.....	.....	310.36	1.39	311.75
Virginia.....	129.41	91.22	204.65	1.05	3,557.77	124.45	3,682.22
Total.....	10,081.68	15,452.17	6,610.85	121.34	298,716.04	17,317.16	316,033.20

TABLE 3.—SUMMARY OF MODES OF PRODUCTION IN SOUTH APPALACHIAN STATES IN 1900.

Mode.	Gold.	Silver.	Total.	Increase (+) or decrease (—).
Placers.....	\$46,984.65	\$472.84	\$47,457.49	—\$27,139.67
Mills.....	145,550.35	1,249.60	146,799.95	+ 4,020.52
Works.....	77,644.02	.....	77,644.02	— 13,366.05
River mining.....	11,844.49	21.21	11,865.70	+ 822.17
Shipping.....	10,081.68	15,452.17	25,533.85	+ 15,103.16
Untraceable.....	6,610.85	121.34	6,732.19	— 3,941.97
Total.....	298,716.04	17,317.16	316,033.20	— 24,501.84

The returns of “works” were entirely due to the chlorination departments connected with the Haile mine, South Carolina, and the Creighton mine, Georgia, and with the new plant of the Dahlonega Consolidated Gold Mining Company, which was put to work in the autumn of 1900.

The Southern Smelting Company was operated only during the latter months of the year. They reported that none of their matte had been marketed during 1900, hence the amounts involved in their work will appear in the tables for 1901.

A few experiments at cyaniding on a small scale were attempted, but I could learn of no important results.

For the most part, the old and satisfactory methods of the past were followed.

As a whole, mining in this section was in good condition at the end of 1900.

The petty mining has sunk to an unprecedentedly small amount.

MARYLAND.

The production of this State is shown in Table 4. Nearly all of this came from the fitful work of Montgomery County.

TABLE 4.—MARYLAND.

County.	Weight.			Value.		
	Gold.	Silver.	Total.	Gold.	Silver. ^a	Total.
Montgomery.....	<i>Fine ozs.</i> 14.447	<i>Fine ozs.</i> 1.23	<i>Fine ozs.</i> 15.677	\$298.64	\$1.58	\$300.22
Unknown.....	4.500	.29	4.790	93.02	.37	93.39
Total.....	18.947	1.52	20.467	391.66	1.95	393.61

^a Coining value.

VIRGINIA.

None of the precious metal mines was systematically worked, and the tenor of information from our correspondents was that operations had reached a very low ebb without prospect of improvement in 1901. (See Table 5.)

The copper belt of Halifax County was further developed, and a considerable quantity of high-grade copper ore shipped, containing a small content of gold and silver. The work of 1901 will probably be considerably increased.

TABLE 5.—VIRGINIA.

County.	Weight.			Value.		
	Gold.	Silver.	Total.	Gold.	Silver. ^a	Total.
	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>			
Fluvanna	5.940	0.18	6.120	\$122.80	\$0.23	\$123.03
Halifax	1.260	70.28	71.540	26.04	90.87	116.91
Loudoun	25.568	.49	26.058	528.54	.64	529.18
Spotsylvania	95.505	16.16	111.665	1,974.27	20.90	1,995.17
Unknown	43.834	9.14	52.974	906.12	11.81	917.93
Total	172.107	96.25	268.357	3,557.77	124.45	3,682.22

^a Coining value.

NORTH CAROLINA.

The yield is tabulated in Table 6. The returns from the old and ordinary methods of business were substantially the same as in 1899; the shipments were greatly increased.

The statements for 1899 fairly indicate the status for 1900. The production for Nash, Franklin, Stanley, Cherokee, Cabarrus, Montgomery, Mecklenburg, Caldwell, Catawba, Burke, Rutherford, Polk, and Union counties remains substantially unchanged.

The dredging plant of the Catawba Placer Mining Company, in Gaston County, was in operation the last months of 1900. In Mecklenburg and Cabarrus a marked disposition to mine ores for the Southern Smelting Company, near Atlanta, has been stimulated, and some important shipments have been made.

The largest operations in this State were in Rowan County, at Gold Hill, at the Union Copper Mining Company's property and the near-by McMakin mine.

At the former mine a still larger dump of low-grade ores has been accumulated and the higher-grade ore shipped. The concentrating plant had not proved a success at the end of the year.

At the McMakin mine concentrating and chlorinating work was at the point of application at the commencement of 1901.

The old and famous Gold Hill mine was in litigation and a receiver was appointed in January, 1901, to make a sale.

A small shipment of argentiferous lead-zinc sulphurets was shipped from Silver Hill, Davidson County.

The Granville and Person counties' copper belt was most actively prosecuted at five points, and more than 7,000 tons of high-grade copper ores were shipped in 1900, all slightly auriferous and argentiferous. The bulk of this ore was shipped from the Holloway mine. The operations of this belt are likely to continue without diminution.

I see no signs of important change in this State in 1901.

TABLE 6.—NORTH CAROLINA.

County.	Weight.			Value.		
	Gold.	Silver.	Total.	Gold.	Silver. ^a	Total.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>			
Burke	244.143	49.94	294.083	\$5,046.88	\$64.58	\$5,111.46
Cabarrus	52.006	12.22	64.226	1,075.05	15.80	1,090.85
Caldwell	3.650	.82	4.470	75.46	1.06	76.52
Catawba	32.989	6.13	39.119	681.94	7.93	689.87
Chatham	20.050	10.92	30.970	414.48	14.12	428.60
Cherokee	43.432	2.25	45.682	897.83	2.92	900.75
Clay	2.250	.22	2.470	46.51	.29	46.80
Davidson	18.763	454.21	472.973	387.87	587.28	975.15
Franklin	128.683	6.58	135.263	2,660.11	8.51	2,668.62
Gaston	51.908	3.18	55.088	1,073.04	4.13	1,077.17
Granville	76.525	4,117.59	4,194.115	1,581.92	5,323.77	6,905.69
Guilford	4.116	.31	4.426	85.08	.40	85.48
Henderson	275.670	172.53	448.200	5,698.60	223.08	5,921.68
Iredell	3.755	.29	4.045	77.62	.37	77.99
Lincoln	1.350	.09	1.440	27.91	.12	28.03
McDowell	67.715	17.10	84.815	1,399.79	22.11	1,421.90
Mecklenburg	108.997	45.86	154.857	2,253.17	59.31	2,312.48
Montgomery	180.594	23.99	204.584	3,733.21	31.02	3,764.23
Moore	20.863	3.26	24.123	431.27	4.02	435.29
Nash	145.504	22.60	168.104	3,007.83	29.22	3,037.05
Person	1.333	75.00	76.333	27.55	96.98	124.53
Polk	11.276	1.06	12.336	233.10	1.37	234.47
Randolph	152.812	53.56	206.372	3,158.90	69.25	3,228.15
Rowan	236.727	7,158.95	7,395.677	4,893.58	9,256.03	14,149.61
Rutherford	31.165	10.30	41.465	644.24	13.33	657.57
Stanly	58.399	5.44	63.839	1,207.22	7.06	1,214.28
Union	95.994	79.03	175.024	1,984.37	102.19	2,086.56
Unknown	89.433	30.78	120.213	1,848.75	39.80	1,888.55
Total	2,160.102	12,364.21	14,524.312	44,653.28	15,986.05	60,639.33

^a Coining value.

SOUTH CAROLINA.

The yield is shown in Table 7. The work in this State is and has been for many years in a very satisfactory condition, with no further fluctuations than is inevitably incident to mining. Only two mines have been worked largely—the Haile, in Lancaster County, and the Douglas, in Spartanburg County.

The former has largely increased its large reserves and has effected improvements in the work in the direction of both efficiency and economy. The ore at command in 1900 was of a lower grade than for several years past.

The prospect for a somewhat increased production in 1901 is good.

TABLE 7.—SOUTH CAROLINA.

County.	Weight.			Value.		
	Gold.	Silver.	Total.	Gold.	Silver. ^a	Total.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>			
Abbeville	27.903	16.53	44.433	\$576.80	\$21.37	\$598.17
Chesterfield	303.955	13.45	317.405	6,283.31	17.39	6,300.70
Lancaster	5,236.526	248.31	5,484.836	108,248.60	321.06	108,569.66
Pickens	2.100	.63	2.730	43.42	.81	44.23
Spartanburg	139.370	19.59	158.960	2,881.04	25.33	2,906.37
Union	214.406	92.04	306.446	4,432.17	119.00	4,551.17
Unknown	9.255	1.05	10.305	191.31	1.35	192.66
Total	5,933.515	391.60	6,325.115	122,656.65	506.31	123,162.96

^a Coining value.

GEORGIA.

The activity seen for many years continues without abatement and with an increase of nearly 7 per cent in returns. The details are given in Table 8.

Milling work was conducted in Carroll, Cherokee, Hall, Lumpkin, McDuffie, Meriwether, and White; dredging was carried on in the Chestatee River and with somewhat greater results. In the other counties only placer work was carried on, amounting to nearly one-sixth of the total production of the State. The marked increases in production were shown in Cherokee, Lumpkin, McDuffie, and Meriwether counties.

In river mining the plants of Birch Brothers and of George W. Sheppard, near New Bridge, on the Chestatee River, were especially prominent; six other plants are projected on the same river.

In White and McDuffie the work is likely to be greater in 1901. Four mines were operated in the former county and three in the latter.

In Carroll County the Southern Klondike Mining Company was brought to the producing point at the end of the year.

In Cherokee County the Creighton was actively at work on an increasingly large scale; the Cherokee was operated intermittently.

The yield of Lumpkin County was materially enlarged. Eight different concerns were at work. The most important enterprise was the Dahlonega Consolidated Gold Mining Company, which commenced its work the latter part of summer and is apparently in a condition to make steady and important returns. This company is very thoroughly equipped and has a very large amount of mining property to draw upon.

The Southern Smelting Company, at Oakdale, 9 miles from Atlanta, spent the earlier part of the year in accumulating a stock of smelting ores and commenced to smelt late in the year; none of its matte had been disposed of at the end of the year. It is probable that its operations will add considerably to the output of the section in 1901.

The work of the State appears to be in good condition.

TABLE 8.—GEORGIA.

County.	Weight.			Value.		
	Gold.	Silver.	Total.	Gold.	Silver. ^a	Total.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>			
Bartow	17.754	3.52	21.274	\$367.01	\$4.55	\$371.56
Cherokee	2,345.862	29.38	2,375.242	48,493.27	37.99	48,531.26
Cobb	24.104	.48	24.584	498.27	.61	498.88
Dawson	90.480	4.25	94.730	1,870.33	5.48	1,875.86
Forsythe	39.618	.17	39.788	818.98	.22	819.20
Habersham	2.851	.54	3.391	58.94	.70	59.64
Hall	46.979	5.88	52.859	971.14	7.61	978.75
Lincoln	3.158	.05	3.208	65.28	.07	65.35
Lumpkin	1,666.530	243.28	1,909.810	34,450.23	314.54	34,764.77
McDuffie	492.726	59.11	551.836	10,185.54	76.43	10,261.97
Meriwether	115.721	2.22	117.941	2,392.17	2.87	2,395.04
Oglethorpe	15.228	1.65	16.878	314.79	2.13	316.92
Paulding	92.128	7.41	99.538	1,904.45	9.58	1,914.03
Rabun	7.019	.12	7.139	145.10	.15	145.25
Union	47.885	-----	47.885	989.88	-----	989.88
White	808.296	82.61	890.906	16,708.97	106.81	16,815.78
Unknown	207.697	48.44	256.137	4,293.47	62.65	4,356.12
Total	6,024.036	489.11	6,513.146	124,527.87	632.39	125,160.26

^a Coining value.

ALABAMA.

For statistics of production see Table 9. The only regular operations conducted were in Tallapoosa and Clay counties, but none were of importance.

The falling off of production was accentuated, and no indications of improvement are visible.

TABLE 9.—ALABAMA.

County.	Weight.			Value.		
	Gold.	Silver.	Total.	Gold.	Silver. ^a	Total.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>			
Clay	3.587	0.08	3.667	\$74.16	\$0.10	\$74.26
Cleburne	45.134	9.28	54.414	933.00	11.99	944.99
Tallapoosa	64.079	18.48	82.559	1,324.61	23.89	1,348.50
Unknown	13.868	22.15	36.018	286.68	28.64	315.32
Total	126.668	49.99	176.658	2,618.45	64.62	2,683.07

^a Coining value.

TENNESSEE.

The returns are shown in Table 10. This amount was the result of petty placer operations on Coker Creek, Monroe County.

TABLE 10.—TENNESSEE.

County.	Weight.			Value.		
	Gold.	Silver.	Total.	Gold.	Silver. ^a	Total.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>			
Monroe	15.014	1.08	16.094	\$310.36	\$1.39	\$311.75

^a Coining value.

As compared with 1899 there was a modest increase in mill returns and in river mining, and a large increase in shipping ores and a notable decrease in the output of placers and works. A very small proportion of the whole product was untraceable.

The distribution by States, metals, fine ounces, and coining values is shown in Table 11:

TABLE 11.—RECAPITULATION.

State.	Weight.			Value.		
	Gold.	Silver.	Total.	Gold.	Silver. ^a	Total.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>			
Alabama	126.668	49.99	176.658	\$2,618.45	\$64.62	\$2,683.07
Georgia	6,024.036	489.11	6,513.146	124,527.87	632.39	125,160.26
Maryland	18.947	1.52	20.467	391.66	1.95	393.61
North Carolina	2,160.102	12,364.21	14,524.312	44,653.28	15,986.05	60,639.33
South Carolina	5,933.515	391.60	6,325.115	122,656.65	506.31	123,162.96
Tennessee	15.014	1.08	16.094	310.36	1.39	311.75
Virginia	172.107	96.25	268.357	3,557.77	124.45	3,682.22
Total	14,450.389	13,393.76	27,844.149	298,716.04	17,317.16	316,033.20

^a Coining value.

SOUTH DAKOTA.

By FRANKLIN R. CARPENTER, Ph. D., F. G. S. A.,

Mining and Metallurgical Engineer.

I herewith send my report upon the output of gold and silver of South Dakota for the year 1900. You will observe that it shows, as compared with 1899, a decrease in gold and an increase in silver.

This is accounted for by a falling off both in the production of both the Homestake free-milling and the silicious or refractory ores, the Homestake output being a decrease of \$54,868 and the refractory a decrease of 13,165 tons. There is, however, a gain in silver, owing to the fact that the Golden Reward Mining Company had permitted its silver-bearing ores to accumulate for several years, it not being desirable to treat them by their chlorination process. But having become possessed of the Deadwood and Delaware Smelting Company's plant, they were able to treat during 1900 this accumulation of silver-bearing ores.

GOLD AND SILVER OUTPUT OF SOUTH DAKOTA FOR 1900.

Description.	Gold.		Silver.	
	Weight.	Commercial value.	Weight.	Commercial value.
	<i>Fine ounces.</i>		<i>Fine ounces.</i>	
Free-milling ores	182,718.92	\$3,776,818	8,267.74	\$5,126
Refractory ores	118,261.73	2,444,470	550,635.48	341,394
Total	300,980.65	6,221,288	558,903.22	346,520

COMPARISON OF OUTPUT WITH PREVIOUS YEAR.

Derivation.	1899.	1900.	Increase.	Decrease.
Gold:				
Homestake	\$3,581,686	\$3,526,818	.....	\$54,868
Refractory ore by railroad	2,610,362	2,419,470	.....	190,892
Other refractory ore	279,000	275,000	.....	4,000
Total	6,471,048	6,221,288	.....	249,760
Silver	111,595	346,520	\$234,925	.....
Total gold and silver	6,582,643	6,567,808	.....	14,835
Refractory ores by railroad	180,025	166,860	.....	13,165

My estimate of the output of gold and silver for South Dakota for the year 1900 is:

	Fine ounces.
Gold	300,980.65
Silver	558,903.22

In my previous reports I have fully described the geology of the Black Hills—how in Cambrian times it consisted of a slowly sinking island of Algonkian schists, which island had been formed by a great fold; how along the trough of this fold the Homestake vein was formed;

how the Cambrian Sea approached from all sides, wore down this island, worked over upon the beach the sands thus derived (which in part consisted of the Homestake vein), and formed of it the great bed of gold-bearing conglomerate surrounding the hills, which has appropriately been called a "fossil placer;" how in more recent geological times a part of the gold in this conglomerate was dissolved out and redeposited at higher and more favorable horizons, forming a second class of deposits of so-called "refractory" ores of the hills. The first class is free-milling; the second class yield their gold only by chlorination, cyaniding, or smelting.

The Homestake vein is, and will always remain, the principal gold producer of the Black Hills; it is practically inexhaustible. It is formed in an immense roll or fold of the schists which dips to the southeast, and from the horizon at an angle of about 35 degrees. Where its various branches cropped out it was nearly 2 miles long. In its deeper workings, where these branches have come together much like the fingers unite to form the hand, it is 430 feet wide. It descends to unknown depths, and sixty years' ore supply are said to be already opened. It was originally covered by many independent locations, but all these have been united under one management. It is not everywhere equally rich, but it yields by amalgamation from \$2 to \$6 per ton. This value has no reference to its assay value, but only to the amount that is free-milling. During the year past the company has operated about 700 stamps. When operated at full capacity they treated about 280 tons per day. Formerly only battery and apron plates were used in amalgamation. They still left considerable value in the tailings. The first attempt to save this value was by concentration of the sulphurets, which were sold to the local smelter.

As this plan was not entirely satisfactory, the company added silver plates, over which they passed the tailings, and which made an additional saving of about 15 cents per ton. This will not seem small when the great number of tons treated is considered. Later, another series of silver plates was added. They were not expected to save more than half as much as the first set, but even $7\frac{1}{2}$ cents per ton is \$75 per day for each 1,000 tons treated. These additions caused a great advance in the value of Homestake stock, and shows, as no other illustration can, the necessity of attention to small things in mining matters. The second additional row having proven highly profitable, a third row was contemplated, although it was not expected to save more than 3 or 4 cents per ton additional; but even this small amount was well worth considering.

About this time the superintendent turned his attention to cyaniding, for while the treatment of low-grade ores had here reached a development not elsewhere equaled, there was still, relatively speaking, quite a percentage of the value escaping. If 40 cents per ton only of this could be recovered it would mean an additional income of about \$1,200 per day. A cyanide expert of the highest rank was called in, and an experimental plant erected to treat tailings of a grade never before attempted. After months of experimental work it was decided that a plant upon a large scale would be justified, and what is said to be the largest cyanide plant in the world was erected, and has at this writing been in operation long enough to more than justify the most sanguine expectations of the company, but a description of its workings and output more properly belongs to the present than to the past year.

In addition to this a new water supply from Little Spearfish

Creek was brought in at an expense of about \$1,000,000. This sum was not all expended in the construction of the ditch and pumping plant, but in order to have a clear title it became necessary to buy all water rights for a distance of more than 30 miles along the valley. This water will permit the operation of many additional stamps and obviate the necessity of closing any part of the works, which formerly was necessary during dry seasons.

Next to the Homestake in importance is the Golden Reward Company, which works refractory ore or the deposits of the second class. Formerly they relied wholly upon chlorination in their ore treatment, but later they bought the plant of the Deadwood and Delaware Smelting Company. This was designed to smelt a very silicious ore. There was at the time of its erection neither copper nor lead ores to be had in the vicinity, so that ordinary methods of smelting could not be employed.

As large bodies of iron sulphide occurred in the hills, it was decided to employ this material to form a matte or carrier for the precious metals. After a few years it became possible to secure copper ores from Butte, Mont., and thereby change the iron matte to a low-grade copper matte, very high in gold. These silicious ores, dolomitic limestone, iron pyrite, and copper ores are smelted together in large blast furnaces of the Rachette type, forming an extremely silicious slag. About 20 tons of charge are concentrated into 1 ton of matte, and this matte subsequently resmelted with practically the same charge, making a final concentration in which 1 ton of matte may, and often does, represent 100 tons of the original charge. It is then shipped to the Omaha and Grant smelter at Omaha, where, without additional preparation, it is added raw to the lead-smelting charge. The matte so treated gives up nearly all of its gold to the lead, which is further treated by the Parke's process and the gold thereby recovered.

The ores which supply this smelter are found in long, horizontal shoots at the union of the Cambrian quartzite and the overlying lime shales. The best ore is found in the lime shales, but the quartzite is also often impregnated. In the early working of these shoots no attention was paid to the lower grade ores found in and upon the quartzite. Recently these have been found to yield their gold readily to the cyanide process, and the Golden Reward Company propose erecting upon the site of their old chlorination mill a cyanide mill for their treatment and for the treatment of such ores as may be free of silver or better suited for cyaniding than smelting. The quantity of such ores in the Black Hills is very great, and it is probable that all of the older abandoned mines, from which the richer shoots have been taken, will now be reworked for this lower grade ore and such ores as were formerly considered not worth working by any process.

The Homestake and Golden Reward companies produce the bulk of the gold mined in the Black Hills, and represent the best types of their respective methods of working, but there are other companies that own mines and reduction works. The Kildonan Company treats the same class of ores as the Golden Reward Company, but by chlorination, which method of treatment, however, is found economical when applied to only a small percentage of even this class of ores, and is now practically abandoned. Other companies employ the cyanide process. A typical company of this class is known as the Wasp No. 2. Their ores are of the second class, i. e., flat deposits.

Formerly, they mined only their high-grade ores, selling these to the smelter. Their entire output averaged \$40 per ton. The former owners of the Wasp shipped ore to the value of \$225,000, and the present owners shipped an amount exceeding \$300,000 before their attention was turned to the lower grade ores lying under these richer shoots. After mining the rich shoots to the extent of about 3,000 feet, holes were drilled in the quartzite upon which the richer shoots had been found, and everywhere it was found to carry gold in values ranging from \$4 to \$7. They then decided to employ the cyanide process for their treatment and erected a mill having a capacity of 35 tons per day. This mill was started upon October 1, 1900. The ore treated during the remainder of that year averaged \$7 in gold and 85 cents in silver per ton. Of this, \$5.70 in gold and 20 cents in silver was recovered. The cost of mining and milling amounted to \$3 per ton. Since that time the capacity of the mill has been increased and the cost of treatment reduced.

These mills are very simple and inexpensive, and this one may be taken as a type. It consists of a No. 3 Gates crusher, two pairs of rolls, a bucket elevator, a shaking screen, and four leaching tanks. A number of such plants, varying in size, have been erected by other companies and a still larger number is projected.

The most important changes in the Black Hills during the past year were the abandonment of the chlorination process and the adaptation of cyanide methods to the treatment of low-grade ores.

The Homestake Mining Company, it is said, will reopen the old De Smet and Caledonia mills, which have long been closed. It is also said that they will erect another cyanide plant of 1,000 tons daily capacity to treat the tailings from the Deadwood-Terra, Caledonia, and De Smet mills. A new smelter is proposed for Rapid City. It is said to consist of furnaces for both the matte process and for lead smelting.

GOLD ORES OF THE BLACK HILLS, SOUTH DAKOTA.^a

By H. M. CHANCE, *Philadelphia, Pa.*

Probably no other prosperous mining district is so little known as the Black Hills.

Aside from the stampede to the Black Hills country in 1876, when gold placers were discovered and 15,000 or 20,000 people became infected with the mining fever, the region has never had a mining "boom."

Quartz mining commenced in 1877 or 1878 and has been successfully prosecuted ever since, the output of gold steadily growing, until at present the yield is about \$7,000,000 annually.

This great production is about equally divided between two entirely different classes of deposits. The first class, comprising the so-called quartz or free milling ores (of which the Homestake mine is the principal producer), are veins of generally steep dip, in the older metamorphosed rocks and similar to the veins worked in other mining districts. The second class of mines is located in what is known as the "siliceous gold belt."

THE SILICEOUS GOLD BELT.

This belt, more particularly to be described in this paper, lies in the immediate vicinity of Deadwood and Lead City and covers an area 6 or 7 miles in length by 3 or 4 miles in width. The formation in which the siliceous ores are found is a nearly horizontal series of sandstones and shales, generally referred by geologists

^a From Transactions of the American Institute of Mining Engineers, 1901, pp. 278-282.

to the Potsdam period. These shales and sandstones were not originally gold-bearing rocks, but they have been cracked and fissured in all directions, and through these cracks and fissures gold-bearing solutions have permeated the formation, giving rise to a series of ore chutes of variable width and thickness and so numerous that the formation is literally riddled with chutes of ore. These ore chutes are usually horizontal and commonly extend for considerable distances in nearly straight lines, following the lines of fissure through which the ore-bearing solution has found its way into the formation.

Within certain limits of the developed area of this formation the formation is so completely mineralized that it is next to impossible to sink a shaft more than 30, 40, or 50 feet, or to drive a drift, upraise, or winze for the same distance, without striking ore. In other words, the uncertainty which usually attends prospecting for ores seems to be almost entirely eliminated, as ore is found in every tunnel or shaft.

Most of these ore chutes yield ore ranging in value from \$10 or \$12 up to \$15 per ton; some average \$20 or \$25 per ton; others have been found ranging in value from \$30 to \$100 per ton; and the general average value of ore found in this formation is from \$12 to \$18 per ton. Of such ore, the quantity is at present incalculable, as will be understood when it is considered that we have here a formation 300 or 400 feet thick, with ore chutes and ore horizons scattered through it from top to bottom, in some places close together, in others more widely separated; that this condition obtains over an area of, say, 4 miles long by 2 miles wide, and that the chutes are of variable width and thickness, so that, while it is not possible to make any statement as to the average width or average thickness, it is evident that the quantity of ore embraced within these limits is enormous.

This siliceous gold belt of the Black Hills seems unique as a gold-bearing formation. I do not know of any other district in the world where such a series of deposits has been discovered. There is no other district, except perhaps the South African gold fields, where shafts may be sunk with the certainty that here obtains of striking ore. This is so thoroughly understood by the owners of the reduction plants that they have bought a large area of practically undeveloped territory. Claims often entirely barren of all evidence of ore have been purchased as confidently as coal operators purchase coal land, with the assurance that, while the coal may not be visible, it will be found beneath the surface. The district has not produced any great bonanza mines. Some ore chutes have been found yielding many hundreds or thousands of tons of ore, ranging in value from \$50 to \$150 per ton, and before the reducing plants were built some of this high-grade ore was hauled by wagon 200 miles for shipment to works in Colorado; but these are exceptional instances. Most of the ore available in this district ranges in value, as already observed, from \$10 up to \$20 or \$25 per ton.

REDUCTION WORKS.

This belt now supplies ore to four reducing plants, as follows:

1. The Deadwood and Delaware smelter, having a capacity of over 200 tons per day.
2. The Golden Reward chlorination mill, with a capacity of about 180 tons per day.
3. The Horseshoe Mining Company's (Kildonan) chlorination mill, with a capacity of 120 tons per day.
4. The Black Hills Reduction Company's cyanide mill, with a capacity of 60 tons per day.

Reducing processes.—The ores of this belt are successfully treated by smelting, by chlorination, and by the cyanide process; and the ability to treat them successfully and profitably both by straight smelting and by pyritic smelting is demonstrated by the Deadwood and Delaware smelter, which uses both processes.

Cost of mining and treatment.—The cost of smelting under the conditions obtaining in this district probably ranges between \$4.75 and \$5.75 per ton, the cost of chlorination is about \$3.50 to 4.50 per ton, and the cost of treatment by cyanide is thought to be somewhat less, possibly \$3 to \$3.75 per ton. The location of reduction works at a point where water power might be used instead of steam power would reduce the cost of treatment by the cyanide and chlorination processes about 50 cents per ton.

Notwithstanding the fact that ores can be treated at the low cost above stated, the metallurgical works charge for reduction \$9 per ton, which, with the railroad freight of 75 cents per ton from the mines to the works, brings the cost for freight and treatment up to \$9.75 per ton. Individual miners and operators, working in a small way, getting out but a few tons of ore per day, generally find that the cost of mining, including dead work and improvements necessary from time to time,

brings the cost of the ore, delivered upon the railroad cars, up to about \$4 or more per ton. This, added to the cost of transportation and reduction, practically leaves no margin of profit on ores averaging less than \$15 per ton. As the assay returns from the reduction works rarely show as large values as those obtained from assays of miners' samples, the miners of the district do not, as a rule, attempt to mine ore that does not show by their own samples an average value of at least \$16 or \$17 per ton.

Profits.—The owners of the reduction works can profitably treat ores from their own properties that do not yield more than \$10 per ton. Now, it is precisely between these limits of \$10 and \$17 per ton that the values of the largest bodies of ore range, and there is in sight in the district probably five or ten times as much ore ranging in value from \$10 to \$17 per ton as can be found exceeding \$17 per ton. It is, therefore, self-evident that so long as the high treatment charges obtain, mine operators, in order to reap anything like the full measure of possible profit, must own and operate their own reduction plants. This fact is now well understood by those familiar with the district, and is appreciated very fully by the owners of the several reduction works already mentioned.

Area already purchased.—Probably two-thirds of the developed area within the limits of this siliceous ore belt has already been purchased by the three great companies operating in the district, namely, the Deadwood and Delaware Smelting Company, the Golden Reward Consolidated Company, and the Horseshoe Mining Company. The plants of these companies were all started in a small way, from six to ten years ago, and after more or less checkered careers have solved the problem of the efficient and economical treatment of the ores, and have grown from small beginnings to their present capacity. From the very outset they have all been steadily enlarging their capacity and are still continuing to enlarge it; they have all been buying additional territory, and are continuing to buy such territory when it can be purchased at what they regard reasonable prices, so that each one of these companies now controls a very large area of mining ground in this siliceous ore belt.

UTAH.

By B. H. TATEM,

Assayer in Charge, United States Assay Office, Helena, Mont.

The value of the gold, silver, copper, and lead won from the mines of Utah was the largest in the history of the State. The quantity of each metal produced and the value thereof was as shown in the table below, the gold and silver being computed at the coinage rate for each and the copper and lead at the year's average price:

Description.	Quantity.	Value.
Gold.....fine ounces..	195,222.629	\$4,035,609.90
Silver.....do.....	9,381,683.69	^a 12,129,853.66
Copper, at \$16.19 per cwt.....fine pounds..	14,416,776	2,334,076.03
Lead, at \$4.37 per cwt.....do.....	97,485,020	4,260,095.37
Total value.....		22,759,634.96

^a Coining value.

A comparison of these figures with corresponding data for 1899 shows the following variations to have occurred:

Metal.	1899.		1900.		Increase.
	Quantity.	Value.	Quantity.	Value.	
Gold.....fine ounces..	169,631	\$3,506,582	195,222	\$4,035,610	\$529,028
Silver.....do.....	7,183,107	9,287,250	9,381,683	12,129,854	2,842,604
Copper.....fine pounds..	9,310,344	1,552,034	14,416,776	2,334,076	782,042
Lead.....do.....	87,707,343	3,920,518	97,485,020	4,260,095	339,577
Total value.....		18,266,384		22,759,635	4,493,251

The above showing is a pleasing one. The increase in value amounted to 24.6 per cent, having been principally in the copper and silver produced. This gain in silver was occasioned by the growing operations in the Tintoc and Park City districts, while the output of copper shows a decided gain at both Bingham and in the Tintic. The output of gold by the Mercur district was somewhat below that of the preceding year, yet the increased yields in this metal by the Tintic and Bingham districts largely overcome this decrease, and a gain of more than one-half million dollars occurred in the State. A gain of over \$339,000 in lead should be distributed to the several districts of the State producing this class of ore.

The quantity and amount of gold won in this State during the years

1899 and 1900 are shown, by comparison, in the following table by the sources in which each originated:

GOLD.

Description.	1899.		1900.		Increase.	Decrease.
	Quantity.	Value.	Quantity.	Value.		
In quartz and dry ores.....	<i>Fine ounces.</i> 14,693.951	\$303,750.92	<i>Fine ounces.</i> 9,266.185	\$191,549.05	-----	\$112,201.87
In cyanide mill bullion.....	101,214.609	2,092,291.66	97,615.196	2,017,885.19	-----	74,406.47
In lead ores.....	27,642.931	571,430.10	18,580.584	384,094.76	-----	187,335.34
In copper ores.....	14,469.427	299,109.60	45,791.842	946,601.39	\$647,491.79	-----
In milling ores.....	11,609.970	239,999.38	23,968.822	495,479.51	255,480.13	-----
Total.....	169,630.888	3,506,581.66	195,222.629	4,035,609.90	902,971.92	373,943.68

Placer mining for gold in this State is not carried on. From the above table it will be noted that the gain was largest in copper ore. This came principally from the Tintic district, where many of the ores carry a considerable percentage of copper, and it seems wise to so class them. In 1899 a part of these ores carried lower percentages in copper, and were classed as smelting ores. It is for this reason that a decrease is to be noted in the amount of gold contained in smelting ores during 1900. The large increase of gold in copper ores and the decrease of the same metal in smelting and dry ores is due to a changed classification of this product rather than to any actual variation in the industry. The decrease of gold in the lead ores was partially due to this cause also, part of the gold heretofore shown as originating in lead ore being now classed as gold taken from milling ores.

The yield of silver in 1900, when compared with that of 1899 by its origin in the several classes of ore, shows the following results:

SILVER.

Classification.	1899.		1900.		Increase.	Decrease.
	Quantity.	Value.	Quantity.	Value.		
In quartz and dry ores.....	<i>Fine ounces.</i> 297,185.69	\$384,240.09	<i>Fine ounces.</i> 251,912.97	\$325,705.64	-----	\$58,534.45
In cyanide mill bullion.....	82,537.21	106,714.78	50,939.11	65,860.69	-----	40,854.09
In lead ores.....	5,028,660.22	6,501,702.09	5,912,183.96	7,644,035.83	\$1,142,333.74	-----
In copper ores.....	611,745.33	790,943.46	1,442,461.96	1,865,001.32	1,074,057.86	-----
In milling ores.....	1,162,978.76	1,503,649.30	1,724,185.69	2,229,250.18	725,600.88	-----
Total.....	7,183,107.21	9,287,249.72	9,381,683.69	12,129,853.66	2,941,992.48	99,388.54

There is but little mining of silver ore in Utah, where this metal is the chief value contained, nearly all of the large amount of silver shown above having been associated with other values in the ores. The properties in the State working in 1900 and producing nearly all of their values in silver were the Ontario mine at Park City and the Chloride Point near Mercur. The product of the former is included in the showing made for milling ores, while the latter was recovered through the use of cyanide.

More than one-half of the silver output of Utah during 1900 was

contained in lead ores. The principal places of production of these ores are the districts around Park City and the Tintic. The mining of silver-lead ores is also a feature of the output in Salt Lake, Tooele, and Beaver counties, but to no such extent as at Park City and in the Tintic. The increase of the silver contained in copper ores worked during the year is due to the increased importance of the output from the mines at Bingham and the larger yield therefrom. The increase in silver won from the mills of the State originated principally from the Tintic, Park City, and Frisco districts.

Nearly all of the output of gold originates in Tooele, Salt Lake, and Summit counties.

The following is a table showing the comparison of the output of gold in the several counties during the last two years:

GOLD.

County.	1899.		1900.		Increase.	Decrease.
	Quantity.	Value.	Quantity.	Value.		
	<i>Fine ounces.</i>		<i>Fine ounces.</i>			
Beaver	1,083.716	\$32,738.31	280.520	\$5,798.86		\$26,939.45
Iron			372.480	7,699.84	\$7,699.84	
Juab	44,917.386	918,188.86	75,355.792	1,557,742.47	639,553.61	
Salt Lake	8,611.380	178,013.03	12,226.970	252,753.91	74,740.88	
Summit	8,803.797	181,990.63	9,093.375	187,976.74	5,986.11	
Tooele	106,214.609	2,195,650.83	97,585.492	2,017,271.15		178,379.68
Utah			308.000	6,366.93		6,366.93
Total	169,630.888	3,506,581.66	195,222.629	4,035,609.90	727,980.44	211,686.06

The large increase in Juab County in the production of this metal was due to the growing importance and active development of the mineral wealth in the Tintic district. Nearly all of the other counties show some increase in this metal, although Tooele County, the largest gold-producing section of the State, exhibited a falling off from that of the preceding year. This was partially due to the consolidation of the De La Mar and Mercur properties in August, and the closing down of the Mercur mill, near Manning, during the balance of the year, thus leaving the Golden Gate mill to work the ores from the two mines, and which had already been working very close to its capacity.

The amounts of silver originating in the several counties during 1900, when compared with the corresponding figures for 1899, show the following results:

SILVER.

County.	1899.		1900.		Increase.	Decrease.
	Quantity.	Value.	Quantity.	Value.		
	<i>Fine ounces.</i>		<i>Fine ounces.</i>			
Beaver	244,939.00	\$316,688.80	143,007.00	\$184,897.94		\$131,790.86
Iron			627.12	810.82	\$810.82	
Juab	3,329,833.10	4,305,238.73	4,809,970.99	6,218,952.40	1,913,713.67	
Salt Lake	201,801.44	260,914.97	238,267.36	308,062.85	47,147.88	
Summit	3,152,329.78	4,075,739.49	3,931,205.00	5,082,770.10	1,007,030.61	
Tooele	225,705.01	291,820.72	258,034.22	333,620.00	41,799.28	
Utah			572.00	739.55	739.55	
Washington	28,498.88	36,847.01				36,847.01
Total	7,183,107.21	9,287,249.72	9,381,683.69	12,129,853.66	3,011,241.81	168,637.87

The most interesting facts to be noted in the above table are the gains of nearly \$2,000,000 in Juab County (Tintic district) and the gain of \$1,000,000 in Summit County (Park City district).

The following statistical tables of Utah production, showing the quantity and values of the various metals, their origin by counties, and from the several classes of ores, together with the final disposition of the ores and bullion as to the sale and treatment, have been assembled from confidential returns furnished by the producers. These totals have been verified by comparison with those made from figures and data given by the United States mints and assay offices and the smelters and refineries that handled the Utah product.

PRODUCTION OF GOLD AND SILVER IN UTAH DURING THE CALENDAR YEAR 1900.

Summary by counties.	Gold.		Silver.		Total value.
	Quantity.	Value.	Quantity.	Coining value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Beaver.....	280.520	\$5,798.86	143,007.00	\$184,897.94	\$190,696.80
Iron.....	372.480	7,699.84	627.12	810.82	8,510.66
Juab.....	75,355.792	1,557,742.47	4,809,970.99	6,218,952.40	7,776,694.87
Salt Lake.....	12,226.970	252,753.91	238,267.36	308,062.85	560,816.76
Summit.....	9,093.375	187,976.74	3,931,205.00	5,082,770.10	5,270,746.84
Tooele.....	97,585.492	2,017,271.15	258,634.22	333,620.00	2,350,891.15
Utah.....	308.000	6,366.93	572.00	739.55	7,106.48
Total.....	195,222.629	4,035,609.90	9,381,683.69	12,129,853.66	16,165,463.56

BULLION OF UTAH PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1900.

Institution.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coining value.	
Mints:					
Philadelphia.....	19.933	\$370.85	1.28	\$1.49	\$372.34
San Francisco.....	1,492.203	27,761.92	1,115.39	1,297.91	29,059.83
Assay offices:					
New York.....	72,826.810	1,354,917.39	9.10	10.59	1,354,927.98
Denver.....	2,675.647	49,779.48	1,973.49	2,296.42	52,075.90
Boise.....	337.858	6,285.73	85.23	99.18	6,384.91
Total.....	77,352.451	1,439,115.37	3,184.49	3,705.59	1,442,820.96

PRODUCTION OF GOLD AND SILVER IN UTAH (ORIGIN DETAILED) DURING THE CALENDAR YEAR 1900.

Origin.	Gold.		Silver.		Total value.
	Quantity.	Value.	Quantity.	Coining value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
In quartz and dry ores.....	9,266.185	\$191,549.05	251,912.97	\$325,705.64	\$517,254.69
In cyanide mill bullion.....	97,615.196	2,017,885.19	50,939.11	65,860.69	2,083,745.88
In lead ores.....	18,580.584	384,091.76	5,912,183.96	7,644,035.83	8,028,130.59
In copper ores.....	45,791.842	946,601.39	1,442,461.96	1,865,001.32	2,811,602.71
In milling ores.....	23,968.822	495,479.51	1,724,185.69	2,229,250.18	2,724,729.69
Total.....	195,222.629	4,035,609.90	9,381,683.69	12,129,853.66	16,165,463.56

ORIGIN, BY PERCENTAGES, OF THE PRODUCTION OF GOLD AND SILVER IN UTAH
DURING THE CALENDAR YEAR 1900.

Origin.	Gold.	Silver.
	<i>Percent- age.</i>	<i>Percent- age.</i>
In quartz and dry ores.....	4.75	2.69
In cyanide mill bullion.....	50	.54
In lead ores.....	9.52	63.02
In copper ores.....	23.45	15.38
In milling ores.....	12.28	18.37
Total.....	100	100

PRODUCTION OF COPPER AND LEAD IN UTAH DURING THE CALENDAR YEAR 1900.

Summary by counties.	Copper.	Lead.
	<i>Fine pounds.</i>	<i>Fine pounds.</i>
Beaver.....	769,648	3,916,510
Juab.....	6,052,157	36,840,579
Salt Lake.....	6,196,660	5,270,495
Summit.....	703,369	46,982,647
Tooele.....	689,362	4,464,469
Utah.....	5,580	10,320
Total.....	14,416,776	97,485,020

DISPOSITION OF GOLD AND SILVER OF UTAH PRODUCTION DURING THE CALENDAR YEAR 1900.

Disposition.	Gold.		Silver.		Total value.
	Quantity.	Value.	Quantity.	Coining value.	
Deposited at the United States mints and assay offices.....	<i>Fine ounces.</i> 69,617.206	\$1,439,115.37	<i>Fine ounces.</i> 2,866.05	\$3,705.59	\$1,442,820.96
Shipped to custom smelters and refineries by producers.....	125,605.423	2,596,494.53	9,378,817.64	12,126,148.07	14,722,642.60
Total.....	195,222.629	4,035,609.90	9,381,683.69	12,129,853.66	16,165,463.56

WASHINGTON.

By FREDERICK A. WING.

Assayer in charge, United States assay office, Seattle, Wash.

Washington has added \$1,177,319.08 to the visible supply of precious metals produced in the United States during the year 1900. As compared with the output for 1899, the increase is shown to be \$13,831.22, as a reference to the appended tables will disclose.

PRODUCTION OF PRECIOUS METALS IN THE STATE OF WASHINGTON DURING THE CALENDAR YEAR 1900.

Metal.	Quantity.	Value.
Gold.....fine ounces..	35,431.634	\$732,436.88
Silver.....do.....	302,569.73	^a 391,201.26
Copper, at \$16.19 per cwt.....fine pounds..	36,831	5,962.94
Lead, at \$4.37 per cwt.....do.....	1,091,945	47,718.00
Total		1,177,319.08

^a Coining value.

PRODUCTION FOR 1900 COMPARED WITH THAT OF 1899.

Metal.	1899.		1900.	
	Quantity.	Value.	Quantity.	Value.
Gold.....fine ounces..	35,284.136	\$729,387.82	35,431.634	\$732,436.88
Silver.....do.....	289,660.67	374,510.76	302,569.73	391,201.26
Copper.....fine pounds..	76,410	13,455.80	36,831	5,962.94
Lead.....do.....	1,032,069	46,133.48	1,091,945	47,718.00
Total		1,163,487.86		1,177,319.08
Net increase				13,831.22

Had not the operations of the Republic mine been interrupted by the erection of their new mill and the consequent closing down for many months incident thereto, the net gain for the year would have been much larger. This deficiency was in part equalized by the increased production of the Mountain Lion and Black Bear-War Eagle mines and others in northeastern Washington. The Eureka and Monte Christo mines, located in the western slope of the Cascade Range, contributed enough to make the net gain mentioned above.

FERRY COUNTY.

Ferry County enjoys the distinction of being the best gold-producing county in the State. Its most important district is the "Republic," and its principal mines so far are the Butte and Boston, Republic, Morning Glory, Quilp, Lone Pine-Surprise, Black Tail, San Poil, Ben Hur,

Mountain Lion, and Tom Thumb, all being located along the extensive porphyry belt running north and south for several miles, and having the thriving little town of Republic as the common center. This belt is nearly a mile in width, and the mines are located along in the order given above, beginning with the Butte and Boston on the south, and ending with the Tom Thumb on the north end of the ledge.

The event of greatest importance to the camp during the year was the completion and opening of the new mill built by the Republic Cyaniding and Power Company to accommodate the operation of their own mines and to handle the custom work of many of the others. The main structure of the new mill is situated directly back of the site formerly used by the old mill and adjoining the mouth of tunnel No. 4 on the south.

About 100 feet north of the tunnel entrance is located the sampling mill. The ore is transmitted from the mine through tunnel No. 4 by tram direct to the sampling works, where it is crushed by rollers preparatory to its transmission to the first ore bin at the top of the main building; here it is passed through immense dryers.

There are about 20 percolating tanks occupying the full width of the mill. The ore is treated by the straight cyaniding process. The main building is 317 feet wide by 320 feet long. In the south wing are the roasting ovens, which are connected by a large brick and stone chimney following an angle up the hill to the ore bin above, where it is connected with the stack. The object is to save a great deal of dust which accumulates from the fumes in burning the ore. The plant will treat 200 tons of ore per day and can be increased to 1,000 tons.

Below the mill are the machine shops, blacksmith shops, stables, etc. The mill and all its accessories give employment to a large number of men and distribute some \$30,000 to \$40,000 per month for wages and supplies.

While the installation of this new plant necessitated the closing down of the Republic mine, thereby reducing its output fully 50 per cent for the year, the camp as a whole makes a creditable showing.

The increased production of the Mountain Lion, Morning Glory, and others in a measure offsets the loss incident to the installation of the new machinery and the building of the new mill at the Republic mine.

Considerable work was done during the year on the Morning Glory. Eight hundred feet of road was graded to connect with the main wagon road to facilitate the hauling of ore. An ore and sorting house was constructed; a machinery station, 28 feet long by 14 feet wide and 9 feet high, was constructed 310 feet from the portal of the main tunnel.

A good deal of timbering was done on the winze as well as other small improvements in the way of development. In constructing the machinery station on the tunnel level a new lead carrying good values was discovered. In order to determine the course of the lead, 20 feet of drifting was done on this level, 20 feet below another drift 25 feet long was made, and 100 feet below the tunnel level (235 feet below the surface) 297 feet of drifts and crosscuts were run for the purpose of exploiting this cross ledge. This work determined a pay chute about 85 feet long, varying from 2 to 15 inches in width, with values running about \$313 per ton. A raise was made from this level 56 feet in ore. The winze was continued down about 50 feet below this level and 60 feet of drifting was done. A drift is also being run from the second level for the purpose of crosscutting another ledge which crops out on the surface, showing good values.

This drift is now in 150 feet. There is in all about 1,700 feet of development work done on the property. During the past year the following machinery was installed and put in operation: One 22-horsepower gasoline hoist; 1 $2\frac{1}{2}$ -horsepower gasoline engine with a No. 3 Buffalo blower, which is used in supplying the mine with air, and a Cornish mine pump with ample capacity to keep the mine clear of water to a depth of 500 feet. There is a large quantity of ore on the dump, which will be treated at a good profit as soon as railroad facilities are completed into the camp.

Another promising property is that owned by the Quilp Gold Mining Company. It has a power plant equipped with a 100-horsepower boiler, a 7-drill compressor, and an 8 by 12 double-cylinder hoist, capable of sinking 600 feet. The blacksmith shop is fitted with the usual appliances for making repairs incident to the operation of a plant of this character. A No. 9 Knowles pump is stationed at level No. 3, and another No. 7 Knowles pump is used for sinking. These pumps will drain the mines to a depth of 600 feet. All machinery is new and in perfect working order. The development work completed on the different levels, tunnels, drifts, crosscuts, etc., aggregate 2,277 feet. In addition to the above, 835 feet of diamond drill work has been done. On level No. 1 a hoisting station 20 by 27 by 11 feet has been built. On level No. 3 a station 7 by 10 by 40 feet has been built and a sump 4 by 5 by 10 feet has been broken out. The mine is equipped throughout with 10-inch air pipes and 3-inch water pipes. The air shaft and winze are timbered, as well as all the parts of the mine where the ground is loose. The development work to date has exploited the ledge for a length of 250 feet at a depth of 350 feet, and has opened up a pay chute 490 by 100 by $10\frac{1}{2}$ feet, equaling 514,500 cubic feet, and, allowing 13 cubic feet to the ton, equals, approximately, 40,000 tons. It is impossible to give an accurate estimate of the value of this body of ore, as the range of value is so great. The assay returns from 25 tons taken from the ore dump, sampled at the Republic Reduction Works, went \$24.12 per ton. The assay returns from 18 tons taken from No. 3 level (as broken down without sorting), sampled at Granby Smelter, went \$44 per ton. Results from the samples taken from the different levels averages \$21 per ton. On this basis 40,000 tons would have a gross value of \$840,000, less \$6 per ton for mining, freight, and treatment, giving a net value of the ore in sight of \$600,000. Future development should open up other ore chutes, as 1,240 feet of the ledge is virgin ground. The ledge on level No. 3 is cleaner ore, and carries better values than on the upper level.

The next properties of importance, taken in their order, are those known as the Lone Pine-Surprise, San Poil, and Ben Hur, all of which have arrived at the producing stage, and on both the Lone Pine-Surprise and Ben Hur much in the way of development was accomplished during the year. On the San Poil there was nothing done during the year 1900. Sample shipments, however, were made to the Republic Power and Cyaniding Company with very satisfactory results. The mine is developed to a depth of 400 feet and two tunnels, 500 feet long, have been run on the lower level, as well as 1,000 feet of drifting. This property and the Black Tail are owned by the same company and about the same amount of work has been done on each.

We then reach the Mountain Lion, which is, undoubtedly, second in importance only to the Republic as a producing property. Although the Tom Thumb mine shipped very little ore during the year 1900, it is capable of being a regular producer. There is about 20,000 tons of ore ready to stope, averaging \$15 in gold and \$3 in silver. The

problem of treating this ore is yet unsolved by the owners of the property.

In the early history of this camp, before the mines had attained any great depth, the ores were believed to be most suitable for cyaniding, but the character of the rock seems to be changing as the workings reach lower levels, and there are to-day thousands of tons of smelting ores on the dumps awaiting the completion of rail transportation to the smelters. The ores being of a highly siliceous character, they will be much in demand for combination with those nearer the boundary, which run high in iron and lead sulphites and carry considerable silver. To bring this camp into greater activity and to place it in the front rank as a great wealth-producing district, it only requires the completion of rail facilities now under contemplation.

There is every prospect that active rail construction will begin before the end of another year.

The Manila mine, at Keller, in the southwest portion of the county, is undergoing considerable development work, and a high-grade gold-copper ore has been uncovered.

STEVENS COUNTY.

The mines in this county are the largest lead producers in the State and also contribute a large proportion of the silver production.

A good deal of prospecting and development work has been done in the county during the past year. It is estimated by competent authorities that fully \$200,000 was expended for assessment work on the various properties, which demonstrates the confidence the people have in the future value of some of their mining properties. The best producing mines in the county are the Deer Trail No. 2, Bonanza, Silver Queen, Zala M., Log Cabin, Conquest, Fannie Woodward, and the Lake View properties.

OKANOGAN COUNTY.

Development work is still progressing on the Palmer Mountain tunnel, and, although the production amounted to very little, it was not from lack of paying ore, but on account of their operations along the line, of perfecting their power plant, and the general betterment of the property.

Some work of a prospective nature was done on the Copper World, in the Palmer Mountain district. A tunnel was started cross cutting the copper vein at a depth of about 100 feet, which necessitated a tunnel of 225 feet in length before the vein was reached, when it encountered some 15 feet of fine ore, carrying gold and copper.

Extensive development work was carried on in the Black Bear-War Eagle mines during the year and several shipments were made. This property is furnished with one 5 and one 15 stamp mill.

The American Flag property on Goat Creek, in the Methow district, was developed during the year, and arrangements are about completed for the erection of a 20-stamp mill.

Near the American Flag mine is the Oriental mine, which is also being developed.

The Tom Hal group of mines, also in the Methow district, owned by the Tom Hal Mining Company, were extensively developed during the year.

The Hidden Treasure mine, on Squaw Creek, has 500 feet of tunnel, a 50-foot winze, and 65 feet of drift. The mine is complete with

buildings and hoisting machinery and shipped some high-grade ore to the smelters during the year.

Adjoining the Hidden Treasure on the west is the Highland Light mine, which has about 250 feet of shaft and 150 feet of drift. The Hunter mine, a low grade copper property on the western slope of Johnson Mountain, has 200 feet of tunneling and 70 feet of winze. In this district the London, another low-grade copper and gold property, is being developed.

Here, following, are some of the mines that have contributed to the output of Okanogan County: The Black Bear-War Eagle mine, in the Winnicut Lake district; the Hidden Treasure, in the Squaw Creek district; and the Boston Boy, Cracker Jack, Eureka, Emma, and Pedro Placer mines, in the Myers Creek district.

CHELAN COUNTY.

In the Chelan mining district some development work is being done on the following properties: The Horseshoe-Davenport group, situated at the head of the Stehekin River, in the Horseshoe Basin. There is a tunnel being run on the vein that will gain foot for foot. The vein is one of the largest fissures in the Cascade Range, cutting through the mountain for miles, and is from 20 to 60 feet wide. On the Davenport and Horseshoe claims the ore chute on the surface is over 1,000 feet in length. The shipping ore, which is silver, lead, and copper, is from 18 inches to 4 feet wide, with from 5 to 20 feet of high-grade concentrating ore in the vein, the first-class ore averaging from 50 to 60 per cent lead, 50 to 60 ounces of silver, and from 3 to 7 per cent copper.

The Black Warrior and Blue Devil vein lies about 4,000 feet south of the Davenport vein, and parallel. The vein is being developed by a cross-cut tunnel, and the character of the ore is silver, lead, and copper, copper predominating.

There is considerable development work being done on several properties on the north fork of Bridge Creek, a tributary of the Stehekin River. The character of the ore is silver, gold, lead, and copper.

On Railroad Creek, a tributary of Lake Chelan, the Holden property is being developed by a large tunnel, and grading has been commenced for a railroad to the mines. The vein is a large body of concentrating ore carrying gold, silver, and copper.

The Crown Point Mining Company is doing extensive development work on their group on Railroad Creek.

The Copper King group was developed by several tunnels and open cuts on the surface. The ore occurs in a "blow-out" or dike, and there were some very rich streaks found, but as yet they have not led to any great body of pay ore. Future development is expected to disclose some very large bodies of high-grade ore, carrying high gold values in tellurium—judging from indications. Down in the southwestern part of the county—that portion formerly belonging to Kittitas County—the producing mines are the Warrior General and the Polepick, in the Peshastin district.

KITTITAS COUNTY.

Kittitas County is a regular contributor to the State's production, the same coming from the placer mines in the Swauk. Reports received show that extensive development work is being done and that the output is somewhat larger than that of 1899.

ASOTIN COUNTY.

The production of Asotin County comes from the placers in the Snake River district. Very little is being taken out, owing to the desultory way in which the work is prosecuted.

LINCOLN COUNTY.

Lincoln County has some promising properties rich in silver, and several small shipments were made to the smelters during 1900. Among those making shipments was the Pennsylvania mine, in the Pitney-Butte district. The formation is granite and porphyry, and the ore carries gold, silver, copper, and a small percentage of lead. The bars along the Columbia River contribute placer dust to the county's output.

The counties on the western slope of the Cascade Range either actual or prospective contributors to the State's production are Whatcom, Skagit, Snohomish, King, and Pierce.

WHATCOM COUNTY.

The principal district in this county, so far as actual production is concerned, is the Slate Creek, the best developed mine being the Eureka, on which a 10-stamp mill capable of handling 40 tons of ore daily is in steady operation. The ore is free-milling gold, carrying large amounts of black tellurides and some sulphides. Other important properties are those of the Mammoth Gold Mining Company, Ninety-nine Gold Mining Company, Gold Standard Mining Company, and the Mountain Goat and Whistler groups of mines. The Mammoth Gold Mining Company has done about 1,200 feet of development work on its property and has a 5-stamp mill of 15 tons daily capacity. A 20-stamp mill will be erected during 1901.

The Ninety-nine Gold Mining Company has about 500 feet of development work done on its property. During the past year arrangements were made for the erection of a 5-stamp mill during the present year.

The character of the ore is the same as those mentioned above.

The Gold Standard group is being largely developed. The ore is the same as that of the Mammoth and is in fact an extension of that ledge. A 10-stamp mill has been purchased for this property.

The Mountain Goat group has a good strong ledge developed by two levels, giving a depth of 300 feet. A 5-stamp mill is on the property.

The Whistler group has performed over 300 feet of development work and an order has been placed for a 10-stamp mill, which will be in operation early in the coming year.

There are several other properties in this district under various stages of development. The formation of the district is quartzite and porphyry. The prosecution of mining in the district is accomplished under many difficulties—all freight reaching it from the east side of the Cascade Range, although the mines are on the west side and it has to be taken over the summit, which is 6,300 feet above tide water. The trail from the east side was made by the mine owners at a cost of about \$40,000. There is a trail to the camp following up the Skagit Valley from Marblemount on the west side, but it is a poor one and not fit for taking heavily loaded pack trains over. Both Skagit and Whatcom counties have assisted in constructing this west-side trail, but the mine owners and prospectors have done most of the work at

their own expense. An effort was made two years ago to get an appropriation from the State, but it failed. Considering the difficulty of reaching the district, the camp has made good progress; still it would be much more progressive if the west-side route was such that freight could be taken direct to the camp from Seattle.

In the Mount Baker district several promising properties are being developed. The Post-Lambert group is sufficiently developed for a mill, but owing to the remoteness of the district none as yet has been installed. During the past year several small shipments of sorted ore were made to the smelters from the district, \$400 per ton being the returns received on same. The ore is high grade, free-milling gold; the formation of the district is diorite.

SNOHOMISH COUNTY.

The principal mining districts in this county are the Monte Cristo, Index, Silver Creek, Sultan, Stillaguamish, Darrington, and Troublesome.

The best producing mines in the county are those at Monte Cristo, which have remained idle for three or four years on account of the washing out of the Everett and Monte Cristo Railroad. During the latter part of the year, however, the rebuilding of this road was completed and actual operations were commenced on these valuable properties.

The reopening of the Monte Cristo mines on August 1, 1900, after the long period of idleness, marked the beginning of a new and prosperous era in the mining industry of this county. Although hardly under way as yet, the shipments of ore average about 900 tons per month, carrying an average value of \$18 per ton. These mines will undoubtedly contribute largely to Washington's production of precious metals, and especially increase the silver output from now on.

The Forty-five Consolidated Mining Company did much development work on its property in the Sultan district during the season, and shipped some 300 tons of ore to the Everett smelter, with satisfactory results. Although the tonnage was small, it was not from the scarcity of paying ore, but rather on account of the changes being made in its plant and the installation of new machinery. Over 2,500 feet of shafting and tunneling were completed and a large amount of ore blocked out. Every indication points toward extensive operations during the ensuing year.

Considerable development work was performed on the properties of the Sultan Mining Company in the Sultan district.

Development work on the Sunset mine, in the Index district, was actively prosecuted, and the property now has about 1,500 feet of drifts, tunnels, and crosscuts. Two new ore bodies were tapped, showing the same character of chalcopyrite ore, averaging 6 to 8 per cent in copper, with small value in gold and silver. It is the intention of the management to put in a concentrating plant next year. Other promising properties in this district are the Copper Bell and Ethel mines. Considerable development work was done on the Ethel during the year.

The Darrington district was the scene of extensive preparatory work during the past year. The Elwell-Darrington property on Palmer Mountain is the best developed mine in the district. A tunnel has been run in at a depth of 500 feet and another at 700 feet, the vein crosscut in each instance exposing a large body of ore. The mine is equipped with the customary blacksmith shops, bunk houses, etc.

Arrangements are complete for the erection of a suitable building for the 50-ton reduction plant recently purchased.

In the Silver Creek district development work was performed on the properties of the Silver Creek Mining Company. Other properties in this district on which work was pushed during the year are the Bonanza, Ontario, and the Queen Anne group. On the Bonanza about 800 feet of tunneling and drifting was done, which makes a total of 2,000 feet of development work accomplished, opening up some extensive ledges of good ore.

The work on the Ontario consisted of 300 feet of tunneling and drifting. On the Queen Anne group about 250 feet of tunneling was done, opening up a large ledge running high in copper and gold.

In Skagit, King, and Pierce counties considerable development work was performed during the past year. The Cascade mining district, in Skagit County, was the scene of activity in mining operations.

In Pierce County development work was performed on various properties in the Mashell, Tahoma, and Carbon River districts, notably on the Surprise mine, a copper property, owned by the Washington Cooperative Mining Syndicate.

In King County considerable development work was accomplished on properties in the Summit, Golden Tunnel, and Salmon Creek mining districts. The Golden Tunnel mine, in the Golden Tunnel district, was supplied during the year with a 30-ton capacity Montgomery pulverizer mill, and about 4,250 feet of steel aerial tram was built. Development work was done on the Highland Fling and Mayflower properties, in Salmon Creek district, owned by the Yellow Jacket Mining Company.

PRODUCTION OF GOLD AND SILVER IN WASHINGTON (ORIGIN DETAILED) DURING THE CALENDAR YEAR 1900.

Origin.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Placer bullion	4,768.325	\$98,570.02	1,043.20	\$1,348.78	\$99,918.80
Mill bullion	18,209.630	376,426.46	24,836.30	32,111.58	408,538.04
Copper ores			2,000	2,585.86	2,585.86
Lead ores			146,300	189,155.55	189,155.55
Dry ores and concentrates classified as smelting ores	12,453.679	257,440.40	128,390.23	165,999.49	423,439.89
Total	35,431.634	732,436.88	302,569.73	391,201.26	1,123,638.14

BULLION OF WASHINGTON PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1900.

Institution.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coining value.	
Mints:					
Philadelphia	492.494	\$9,162.68	158.34	\$184.25	\$9,346.93
San Francisco	2,304.979	42,883.33	6,872.46	7,997.04	50,880.37
Assay offices:					
Boise	193.314	3,596.54	44.38	51.64	3,648.18
Helena	156.775	2,916.74	51.50	59.93	2,976.67
New York	351.219	6,534.31	123.00	143.13	6,677.44
Seattle	5,831.257	108,488.50	2,494.60	2,902.81	111,391.31
Total	9,330.038	173,582.10	9,744.28	11,338.80	184,920.90

DISPOSITION OF GOLD AND SILVER OF WASHINGTON PRODUCTION DURING THE CALENDAR YEAR 1900.

Disposition.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Deposited at the United States mints and assay offices	8,397.034	\$173,582.10	8,769.85	\$11,338.80	\$184,920.90
Shipped to custom smelters and refineries by producers	27,034.600	558,854.78	293,799.88	379,862.46	938,717.24
Total	35,431.634	732,436.88	302,569.73	391,201.26	1,123,638.14

DEPOSITS OF GOLD BULLION AT THE UNITED STATES ASSAY OFFICE, SEATTLE, WASH., DURING THE CALENDAR YEAR 1900.

Source.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coining value.	
Alaska	228,813.184	\$4,256,989.47	29,855.49	\$34,740.93	\$4,291,730.40
California	35.973	669.26	7.12	8.28	677.54
Idaho	292.795	5,447.35	42.71	49.70	5,497.05
Montana	4.715	87.72	2.17	2.52	90.24
Oregon	190.822	3,550.18	58.31	67.85	3,618.03
South Dakota	7.211	134.16	.28	.33	134.49
Washington	5,831.257	108,488.50	2,494.60	2,902.81	111,391.31
British Columbia	35,359.544	657,851.98	8,073.11	9,394.16	667,246.14
Northwest Territory	897,030.430	16,688,938.23	221,288.08	257,498.86	16,946,437.09
Mexico	5.055	94.05	2.80	3.26	97.31
Jewelry	142.991	2,660.29	38.06	44.29	2,704.58
Mutilated domestic gold coin	5.000	93.03	-----	-----	93.03
Foreign coin	443.366	8,248.67	.86	1.00	8,249.67
Total	1,168,162.343	21,733,252.89	261,863.59	304,713.99	22,037,966.88
Redeposits	42.189	784.91	37.81	44.00	828.91
Grand total	1,168,204.532	21,734,037.80	261,901.40	304,757.99	22,038,795.79

WYOMING.

By FRANKLIN R. CARPENTER, M. A., Ph. D.,
Mining and Metallurgical Engineer.

I estimate the gold and silver output for Wyoming for the year 1900 to be as follows:

	Fine ounces.
Gold.....	4,650
Silver.....	10,222

The gold production of Wyoming comes mainly from placers, but there are certain mines whose principal output is copper that yields some gold and silver as a by-product. The most important district is known as Grand Encampment, in Cabbon County. This district takes its name from the town of Encampment, which, it is supposed, will become the commercial center of the section. This district adjoins Colorado upon the north, and the productive area extends south into Colorado.

The principal mines occur within a radius of 30 miles of the town of Encampment. The ores are mainly lenses of very high grade copper sulphide, occurring in granite. Among the best known are the Ferris-Hagerty and the Rambler, to the west. These two have been the largest shippers. To the east of Encampment are found the New Rambler, Beaver, Bean Mining Company, Evening Star, Cox, Bay Horse, Ruby, and Hawk-Eye mines, all of more or less importance. The principal output of all the mines of the district is copper, but the ores, nevertheless, carry gold and silver, which are recovered in the copper refining process, and which finally go into circulation, and should, therefore, be credited to Wyoming. While I have given the subject close attention, I have been entirely unable to get actual figures of this gold and silver product. Some of the ores are so low in precious metals that the smelters, while recovering them, make no returns of their value, nor is it paid for as gold or silver. In some instances, however, the ores carry as high as \$12 per ton in gold. I received many widely varying statements, and have had some assays made upon ores from the section, but am unable to state definitely what the average actually is. Other mines, like the Hawk-Eye and Evening Star, are white quartz mines, whose value is mainly gold. They have as yet produced nothing.

The Ida mines, upon Douglas Creek, which section is tributary to this, shows a fair grade of gold-copper ore, selected samples of which give very high results, sometimes exceeding \$100 per ton in value.

There is one concentrating plant for the treatment of low-grade ore, namely, the Kurtz-Chatterdon, but its output will belong to the present, rather than the past year. The Elk Mountain Company claim for their ore a gold value of \$5 per ton. The silver, in all instances, is low, not often exceeding 1 ounce per ton of ore, but as this is also recovered in the refining, I have allowed for it.

In other sections of Wyoming, as, for instance, that adjoining the town of Lusk, this same, or very similar, quartz bed has been worked for silver. In one instance a mill was erected for its extraction.

The contents of the ore, however, were too low to pay by any process and the venture came to naught.

The most promising silver-gold mining section, however, in the entire State is, in my opinion, the Wind River section, located in the western part. The veins here are numerous, well defined, and carry high gold and silver values. They are similar to the fissure veins of the ordinary type, found in other parts of the great Rocky Mountain range. They more closely resemble those of Summit County, Colorado, than others known to the writer. The principal owners are Schnitzel & Co., of Lead City, S. Dak. Their development is retarded wholly by want of transportation facilities. Ultimately they must become very valuable.

From the sketch above given it will be observed that lode mining for the precious metals in Wyoming is more a matter of promise than of performance. The production at present consists almost exclusively of the gold and silver produced as a by-product from deposits that are worked primarily for copper.

PLACER MINING.

There are several districts in Wyoming in which placer gold mining has been carried on for a number of years. The Four-Mile Placer district is about 60 miles south of Rawlins and just north of the dividing line between Wyoming and Colorado. It is a very large section, probably exceeding 40 miles square, and while it consists of very rich ground, it is usually very shallow and is difficult to work on account of the small fall, which provides no dump for the waste material. It is proposed to bring water to these placers by means of a ditch, which must needs be at least 40 miles long. When this is done, the district is capable of adding very greatly to the gold production of Wyoming.

A more important placer mining district is that near Atlantic City, in the South Pass section. It is operated by a company known locally as the "Big French Company." They have brought water from a branch of the Green River, at a very heavy expense, and while the gold is known to exist in considerable quantity, the production has not, as yet, been very great. There are, also, in this district, a few lode claims, but they are in the main undeveloped.

A third placer mining district exists, in the northeast part of the State, where a portion of the uplift known in South Dakota as the Black Hills, passes over the line into this State. Like all other parts of the Black Hills, it is gold bearing, but the entire product comes from placers. While the area is quite small, it has been worked since 1876. The gold is very coarse, and in the language of the miner, "has not traveled far," but all attempts at locating its source have failed. The area of gold-bearing schists exposed is only about 4 miles square. Everywhere around this area they are covered by the Cambrian quartzite, which, also, at one time covered the exposed area.

Here, as in other parts of the hills, this quartzite was derived by an advancing ocean directly from the underlying gold-bearing slates.

The lodes from which this gold was derived have probably not yet been exposed by the erosion now going on, and the gold came into

these gulches by way of the quartzite, exactly as at Deadwood. If this theory is true, a vein corresponding to the Homestake should exist beneath the quartzite, and just south of the area that is exposed. The placers are worked only in the spring, when the melting snows give the necessary water. Not only the gulches, but the hill placers also, show gold in paying quantities, and it has long been proposed to bring water from Sand Creek for their working, but the great cost of such an enterprise will prevent its realization. The most notable thing about this placer gold is its intimate association with tinstone, so that, while the mines are worked primarily for gold, quantities of tinstone are also obtained, of which the present writer has smelted many pounds.

PART II.

PRODUCTION OF GOLD AND SILVER IN FOREIGN COUNTRIES.

PRODUCTION OF GOLD AND SILVER IN FOREIGN COUNTRIES.

AFRICA.

The gold production of Africa, which in 1898 furnished \$80,128,485, or nearly 28 per cent of the world's product, dropped in 1900 to the comparatively insignificant figure of \$8,671,943, a loss of 89 per cent. This was the direct result of the war in the Transvaal.

The following table shows whence the output has been derived since 1889:

Year.	Transvaal.		West Coast.		French colonies. ^a		Rhodesia. ^b		Total.	
	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.
	<i>Kilos.</i>		<i>Kilos.</i>		<i>Kilos.</i>		<i>Kilos.</i>		<i>Kilos.</i>	
1889	11,719	\$7,788,372	1,270	\$844,262	261	\$173,461	(^c)	.....	13,250	\$8,806,095
1890	15,706	10,438,356	1,062	705,705	261	173,461	(^c)	.....	17,029	11,317,522
1891 ...	22,398	14,885,639	1,289	856,730	261	173,461	(^c)	.....	23,948	15,915,830
1892	34,938	23,220,108	1,528	1,011,924	^d 261	173,461	(^c)	.....	36,722	24,405,493
1893	42,573	28,293,831	977	649,695	261	173,461	(^c)	.....	43,811	29,116,987
1894	59,730	39,696,330	865	574,653	261	173,461	(^c)	.....	60,856	40,444,444
1895	66,045	43,893,300	995	661,630	261	173,461	(^c)	.....	67,301	44,728,391
1896	65,874	43,779,669	945	627,938	261	173,461	(^c)	.....	67,080	44,581,068
1897	86,720	57,633,861	751	499,311	640	425,510	(^c)	.....	88,111	58,558,682
1898	119,190	79,213,953	518	343,928	189	125,987	669	\$444,617	120,566	80,128,485
1899	107,410	71,384,561	422	280,185	344	228,512	1,700	1,129,773	109,876	73,023,031
1900	9,215	6,124,226	326	216,873	1,115	741,029	2,392	1,589,815	13,048	8,671,943

^a Includes Madagascar, Algeria, and the French Soudan.
^b Includes Mozambique, Cape Colony, Zululand, and Natal.
^c Previous to 1898 Rhodesia and Mozambique together produced 289 kilograms fine, included in the Transvaal returns.
^d Previous to 1897 the only figures obtainable were those for 1892, Madagascar only.

Even with the losses of war, the Transvaal continues to be the principal gold-producing field in Africa. There has been notable progress in the French colonies and Rhodesia, as shown by the following table, where the results of 1898 are taken for comparison to eliminate the influence of the war:

Country.	1900.	1898.	Increase.	Decrease.
Transvaal.....	\$6,124,226	\$79,213,953	.....	\$73,089,727
West Coast.....	216,873	343,928	.....	127,055
French Colonies.....	741,029	125,987	\$615,042	.....
Rhodesia.....	1,589,815	444,617	1,145,198	.....
Total.....	8,671,943	80,128,485	1,760,240	73,216,782
Net decrease.....	.....	.....	.....	71,456,542

THE TRANSVAAL.

The total production of gold in the Transvaal during 1900 was 348,760 ounces, as given by L'Economiste Europeen (September 20, 1901, p. 383). The latter's figures for the last three months of 1899 and the first five months of 1900 are embodied in the following table, which shows the annual production of the Witwatersrand, by months, since 1894:

Month.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
January	149,814	177,463	148,178	209,832	313,827	410,145	80,785
February	151,870	169,295	167,018	211,000	297,976	404,335	64,408
March	165,372	184,945	173,952	232,066	325,908	441,578	84,546
April	168,745	186,323	176,707	235,693	335,125	439,111	54,772
May	169,773	194,580	195,008	248,305	344,160	444,933	64,249
June	168,162	200,941	193,640	251,529	344,671	445,763	.....
July	167,953	199,453	203,873	242,479	359,344	456,474	.....
August	174,977	203,573	213,418	259,603	376,912	459,709	.....
September	176,707	194,764	202,561	262,150	384,080	411,762	.....
October	173,378	192,652	199,889	274,175	400,791	26,904	.....
November	175,304	195,218	201,113	297,124	393,311	55,941	.....
December	182,104	178,428	206,517	310,712	419,504	68,525	.....
Total	2,024,159	2,277,635	2,281,874	3,034,673	4,295,609	4,065,180	348,760

Thus it is seen that the loss of the gold production through the war in Transvaal exceeded 3,700,000 ounces, or \$73,000,000, amounting to 92 per cent of the production of 1898. Measured by the standard reached in 1899 the loss must have been still greater, since a comparison of the nine months preceeding the outbreak of hostilities with the corresponding months of 1898 shows an excess of 831,813 ounces, or 27 per cent in 1899 over 1898. Since May, 1900, there are no returns, operations evidently having been totally suspended.

The following table shows the annual output of the mines from the opening till the end of 1900:

GOLD PRODUCTION OF THE WITWATERSRAND.

Year.	Quantity.	Year.	Quantity.
	<i>Ounces.</i>		<i>Ounces.</i>
1887	23,125	1894	2,024,164
1888	208,122	1895	2,277,640
1889	369,557	1896	2,280,892
Estimated unrecorded production, 1887, 1888, 1889	42,000	1897	3,034,679
1890	494,817	1898	4,295,609
1891	729,268	1899	4,065,180
1892	1,210,869	1900	348,760
1893	1,478,477	Total	22,883,159

The gold product of the Transvaal has heretofore been calculated by this Bureau at \$17.56 per ounce, crude, representing an average fineness of 0.849½. Three hundred and forty-eight thousand seven hundred and sixty ounces, at \$17.56 per ounce, would give a value of \$6,124,226, representing 296,260 ounces, or 9,215 kilograms, fine.

The corrected figures of the product for 1899 show 4,065,180 ounces instead of 4,081,991 ounces, crude, which reduces the value of the product of 1899 to \$71,384,561, representing 107,410 kilograms, fine.

RANDT AND TARKWA CONTRAST.

[From The Statist, London, July 13, 1901.]

In an interesting pamphlet of reprints of contributions made by M. Henri Dupont to the Revue Sud Africaine, at pages 52-53 we find some particulars especially worth reproduction. M. Dupont sets out how on the Randt, in six years to 1898, inclusive, with increased volume of crushing, the grade of ore declined, while the expenses per ton were diminished to a greater extent than the falling off in the value per ton of the ore treated, with a net outcome of gradual increase in the profit per ton. The figures are as follows:

Year.	Tons milled.	Value.	Ex- penses.	Profit.
		s. d.	s. d.	s. d.
1894	1,987,000	46 7	35 0	11 0
1895	2,588,605	43 2	30 0	12 2
1896	2,518,581	41 0	29 6	11 6
1897	2,663,523	41 1	27 5.1	16 6
1898	4,295,609	41 4	27 1.4	21 2

WEST COAST OF AFRICA.

The product of the west coast of Africa is assumed to equal the amount of its bullion exports to Great Britain during the year.

GOLD IMPORTED INTO ENGLAND FROM THE WEST COAST OF AFRICA SINCE 1889.

Year.	Weight.		Value.	Weight, fine.
	Standard (916 $\frac{2}{3}$).	Fine.		
	Ounces.	Ounces.		Kilograms.
1889	44,554	40,841.17	\$844,262	1,270
1890	37,242	34,138.50	705,705	1,062
1891	45,212	41,444.33	856,730	1,289
1892	53,402	48,951.83	1,011,924	1,523
1893	34,286	31,429.00	649,695	977
1894	30,326	27,798.83	574,653	865
1895	34,916	32,006.33	661,630	995
1896	33,138	30,376.50	627,938	945
1897	26,350	24,154.17	499,311	751
1898	18,150	16,637.50	343,928	518
1899	14,786	13,553.93	280,185	422
1900	11,445	10,491.25	216,873	326

WEST AFRICAN GOLD MINING.

[From The Mining World and Engineering Record, London, January 19, 1901.]

About three years have elapsed since we informed our readers that a few prominent capitalists in the city—not of the class usually identified with gold mining projects—were turning their attention to the development of the gold resources of west Africa, a region known to be enormously rich in the precious metal, but which for various reasons was almost entirely neglected at the time by the British investor. That a great gold industry existed there for generations past is well known. Mr. George McDonald, in the volume he has published, goes so far as to say that gold to the value of £600,000,000 has been won from this corner of the Dark Continent.

The operations were conducted mostly by natives, and all over the country there are evidences of the extent to which they worked. Now, it is a well-known fact that the natives considered ore yielding less than about 2 ounces to the ton unprofitable, and even this class of ore they could only work with the primitive appliances they possessed at or near the surface. Hence it may be fairly assumed that the auriferous territories of the Gold Coast Colony and Ashanti have so far only been very partially scratched, and their actual gold-producing potentiality will be demonstrated in the years that are to come.

The obstacles that have hitherto caused the white "gold seeker" to leave west Africa very much alone are likely soon to be nonexistent. Chief among these is the transport difficulty, and the colonial government has authorized the immediate expenditure of £733,500 for the extension of the railway from Tarkwa to Kumasi.

Mr. Chamberlain has expressed his firm conviction that the gold industry in the colony is going to be "a most solid, valuable, and profitable one," and recognizing the colonizing power of gold discovery and what it has done for South Africa, Australia, and California, the colonial secretary is prepared to afford every assistance in his power to those who are seeking to open up and turn to account the treasures of west Africa. The construction of the railway has been intrusted to Messrs. Shelford & Son, who are making a great effort to expedite the work, and within the next two years it will probably have reached Kumasi and be open for the conveyance of machinery. It is intended, however, to open sections of the line as the work of construction proceeds. The line from Sekondi to Tarkwa is probably by this time nearly completed. Another factor that has prevented the systematic development of mining properties in west Africa by Europeans in the past has been the climate. The Gold Coast, in fact, has been looked upon as the "white man's grave." This idea, however, has now been exploded, or at any rate modified to such a degree that it may be regarded as little more than a bogey. In the low-lying districts near the coast the climate is certainly unfavorable for Europeans, necessitating strict abstinence and the utmost attention to hygienic rules, but in many parts of Ashanti the climate is positively salubrious. Malaria does exist, but it is of a very mild form. Tropical scourges, such as plague, cholera, yellow fever, typhoid, etc., are practically unknown.

* * * * *

It has now been proved beyond a doubt that similar formations exist in West Africa to those met with on the Witwatersrand. Some of the best experts on the Rand, taking advantage of the enforced idleness of the mines there, have, during last year, visited the gold coast, and investigated its auriferous areas on behalf of the big South African houses. The result of this investigation has been to prove the existence of a banket formation superior in quality and capable of being more easily worked than that of the Rand. As a matter of fact, one mine—the Wassau—has crushed over 50,000 tons of banket, which yielded 45,500 ounces of gold, irrespective of the tailings, which are said to contain 5 pennyweights or 6 pennyweights per ton. It is an astonishing fact that this banket has been worked in Wassau for many years, and no one—not even the engineers there—knew that it was exactly similar to the conglomerate formation worked on the Rand. The discovery was made by Mr. Struben, the gentleman who discovered the Witwatersand, who happened by mere chance to see a specimen from the Wassau property in an office in the city.

FRENCH COLONIES.

ALGERIA.

Algeria produces no gold. The silver product for 1899 amounted to 200 kilograms fine, of the United States coining value of \$8,312.

MADAGASCAR.

The official information on the subject of the gold production of Madagascar is somewhat conflicting. According to information from the French minister of public works, received through the Hon. Horace Porter, United States ambassador at Paris, the gold product for 1899 was given at 344 kilograms, valued at 1,184,000 francs, representing \$228,512; and for 1900, 1,115 kilograms, of a value exceeding 3,000,000 francs, representing \$741,029, the United States value in each case, being computed from the stated weight of the product.

Upon reference to the report of the French mint for 1901 (p. 109), it appears that the sum 1,184,000 francs represents the value of the exports for 1899, viz., 423 kilograms, estimated at 2.80 francs per gram, which is equal to \$540.26 per kilogram and corresponds to a fineness of 0.812. At this rate of fineness, 423 kilograms crude, appear to correspond to 344 kilograms fine.

But the chief of the mining service at Madagascar, in his report to the governor of the colony, gives the value of the exports for the same year at 1,070,825.70 francs and values the gram at 2.70 francs, (*L'Economiste Européen*, August 17, 1901, p. 223). This would correspond to 397 kilograms crude, of an estimated fineness of 0.783.

The same valuation was adopted by him in computing the quantity of the product of 1900 from the value of the exports given as 3,009,160.80 francs, the result being 1,115 kilograms (more exactly, 1,114.504 kilograms). This figure appears in the report of the director of the French mint and is also reproduced from the report of the chief of the mines, department of Madagascar, by *L'Economiste Européen*, and the Board of Trade Journal (May 16, 1901, pp. 383-384).

It is thus apparent that the figure for 1900 represents crude gold of an estimated fineness of 0.783. This value was fixed by the decree of July 20, 1896; it is thought, however, by the same authority, to be much below the true value, which amounts, at Madagascar, to 3 francs, or 3.10 francs, corresponding to a fineness of 0.869, or 0.899.

It is considered that the estimated value of the exports of unrefined gold must, of necessity, be in the nature of a conjecture; little reliance can be placed on the figures of the gold production for Madagascar.

THE GOLD MINES OF MADAGASCAR.

[From *L'Economiste Européen*, August 17, 1901, p. 223—Translation.]

Chief Monneyres, of the mining service at Madagascar, has recently submitted to the governor of the colony his report, wherein he says that the large increase in the gold production of the colony which marked the year 1899 as compared with the year 1898 was maintained at the same rate in 1900. The same applies to exports, so that within the two years last past the quantity of gold exported from Madagascar was increased nearly tenfold. Following are the figures of exports for the last three years:

	Francs.
1898.....	338,522.16
1899.....	1,070,825.70
1900.....	3,009,160.80

The last figure represents, at the rate of 2.70 francs per gram, the quantity of 1,114.504 kilograms. The rate was fixed by the decree of July 20, 1896. It is, however, much below the true value, which amounts at Madagascar to 3 or 3.1 francs.

Of the above quantity the several concerns of Ampasary contributed 538.811 kilograms, leaving 575.963 kilograms for all other concerns.

This amount, compared with the total of 386.390 kilograms for the year 1899, shows that even without the lucky discovery of Ampasary, which has nearly doubled the production, the output of other concerns increased within 1900 at the rate of 50 per cent.

The characteristics of the movement of the mining industry in 1900 were as follows:

(1) The discovery and operation of a very extended layer, far richer than those operated heretofore (Ampasary).

(2) As a consequence a rapid increase, but of short duration, of the number of workings.

(3) As a further consequence of the same discovery an important revival of prospecting for gold mines, which is full of promise, already partly satisfied, of new discoveries of rich layers.

(4) A large increase of the quantity of gold exported.

(5) Absence of notable improvement in the processes of extraction.

The latest prospecting operations undertaken since the discovery of the Ampasary layers seem to have borne fruit. New layers, though not as rich as those of Ampasary, paying still more than the old layers of the high plateau, have been discovered in the east. As to the Ampasary layer, there is reason to think that it is far from being exhausted.

BRITISH COLONIES.

The total gold product of the British colonies in Africa for 1900 amounted to 2,391.98 kilograms, of the value of \$1,589,815.

CAPE COLONY.

The United States consul at Cape Town reports that the product of gold for 1900 for that colony was 3.932 kilograms, valued at £492 (\$2,394), representing 3.6 kilograms fine.

NATAL.

The product of gold reported from Cape Town for the colony of Natal for 1900 was 405 kilograms, valued at £52, equal to \$253, representing 0.38 kilogram fine.

Following is an extract from the report on the mining industry of Natal for the year 1899:

At the end of 1899 prospecting for gold was almost at a standstill, all the gold fields being threatened by the Boers with the exception of that near Umzinto.

The output of gold for the year was 61½ ounces, 42 ounces being obtained from Mr. Household's mine on the Umsinga gold field and 19½ ounces from Mr. Faux's mining lease on the Umzinto gold field, formerly the Natal Gold Mining Company's property.

GOLD PRODUCTION.

NATAL.

Year.	Ounces.	Year.	Ounces.
1889	350	1895.....	139
1890	276	1896.....	42
1891	124	1897.....	40
1892	59	1898.....	17
1893	48	1899.....	61½
1894	66		

ZULULAND.

1889	} No record.	1894.....	784
1890		1895.....	264
1891		1896.....	1,174
1892		1897.....	57
1893			

RHODESIA.

The report from the Rhodesia chamber of mines gives the product of gold for 1900 at 91,850 ounces, which at \$17.28 (the average value per ounce crude) gives a value of \$1,587,168 corresponding to 2,388 kilograms fine.

The following table is given showing the product by months.

RHODESIA CHAMBER OF MINES GOLD REPORT.

[From returns furnished by the companies.]

OUTPUT FOR 1900.

Month.	Quantity.	Month.	Quantity.
	<i>Ozs. dwts.</i>		<i>Ozs. dwts.</i>
January.....	5,242 7	August	10,137 15
February.....	6,232 15	September.....	10,749 10
March	6,285 16	October.....	10,545 0
April.....	5,456 0	November.....	9,351 12
May.....	6,553 12	December	9,373 1
June	6,185 9		
July.....	5,737 12	Total	91,850 9

ITALIAN EAST AFRICA.

GOLD DEPOSITS IN ERYTHREA.

[From The Board of Trade Journal, January 17, 1901, p. 157.]

A dispatch has been received at the foreign office from His Majesty's ambassador at Rome, reporting that Sig. Fusinato, under secretary of state for foreign affairs, stated in the Chamber of Deputies on December 15, last, that a concession to work the gold deposits in Erythrea was granted on June 8 last to a company designated the "Società Eritrea per le Miniere Aurifere," with a capital of 2,000,000 lire (£80,000), half to be Italian, and under the direction of a council of administration to be presided over by an Italian subject, of which the majority must be Italians. Sig. Fusinato added that the most important points conceded to the society are: The right of subterranean search in three plots of land, each plot covering an area of 10,000 hectares, and the enjoyment of the concession for thirty years, with power to prolong the same to a maximum period of ninety-nine years, the Italian Government to levy a royalty of 5 per cent on the metal extracted from the mines. He could only say that so far the first experiments had been satisfactory and that it had been proved that the colony was auriferous.

ARGENTINA.

The United States minister at Buenos Ayres reports that the gold product did not exceed \$50,000, and the silver product could only be estimated by the value of ore reported, which was \$22,800 (commercial value).

According to an estimate made by the firm of Arning & Sons, of Buenos Ayres, the gold production of 1900 amounted to 2,112 ounces, presumably fine, which represents a value of \$43,659.

The exports of gold and silver ores in 1900 were, according to the bulletin on foreign commerce issued by the Government of Argentina (Le Commerce Extérieur Argentin, No. 108), as follows:

Description of ore.	Weight.	Value in gold piasters.
	<i>Kilograms.</i>	
Gold and silver	10,000	.....
Gold and silver bearing copper.....	58,658	12,700
Silver	8,200	4,100
Silver-bearing copper	135,689	26,300
Silver lead	47,566	18,700

The total value of all silver ores exported, exclusive of those containing gold, was 49,100 gold piasters, equivalent to \$47,370, which is more than twice the estimated value given by our minister. A part, however, of this value represents copper and lead.

In the absence of authentic information coming from Argentine official sources, the estimate of Messrs. Arning & Sons is accepted as the value of the gold product for 1900 and that of the United States minister for the silver product.

[From The Board of Trade Journal, London, June 20, 1901, p. 689.]

The acting British consul at Buenos Ayres reports that, according to figures furnished him through the courtesy of Messrs. Arning & Sons, of that city, the approxi-

mate production of refined gold for the whole Republic has been as follows for the years 1890 to 1900, inclusive:

OUTPUT OF GOLD.

Year.	Quantity.	Year.	Quantity.
	<i>Ounces.</i>		<i>Ounces.</i>
1890	5,448	1896.....	2,952
1891	5,184	1897.....	3,972
1892	4,284	1898.....	4,416
1893	4,224	1899.....	3,912
1894	2,556	1900.....	2,112
1895	2,820		

It is quite impossible to obtain the exact output of the Republic, as some ore is sent for assay to England by prospectors who make no mention of their shipments, and some of the production of the Republic finds its way to the Pacific coast ports for shipment, but Messrs. Arning & Sons have collected their data from various sources, and consider them the most approximately approaching the exact production.

AUSTRALASIA.

GOLD.

The gold production of Australasia in 1900 was, according to the report of the department of mines of western Australia, 4,176,142 crude ounces, valued at £15,103,025, or \$73,498,871.

This shows a decrease of the gold product amounting, in round figures, to \$5,800,000, or 7.4 per cent compared with the year 1899.

The tables following give the products by colonies:

AUSTRALASIAN GOLD PRODUCT, 1900.

[From Western Australia department of mines mining statistics, 1900.]

Colony.	Gross weight.	Value.	United States value.	Fine weight.	Average fineness.
	<i>Ounces.</i>			<i>Ounces.</i>	
Western Australia.....	1,580,950	£6,007,611	\$29,236,039	1,414,293	0.8945
New South Wales	345,650	1,194,521	5,813,136	281,210	.8135
Victoria	807,407	3,190,940	15,528,710	751,201	.9303
Queensland	963,189	2,871,709	13,975,172	676,049	.7018
Tasmania	81,175	316,220	1,538,884	74,443	.9170
South Australia	24,155	82,422	401,107	19,404	.8033
New Zealand.....	373,616	1,439,602	7,005,823	338,906	.9070
Total	4,176,142	15,103,025	73,498,871	3,555,506	.8513

In the following table the official figures for 1896, 1897, 1898, and 1899 are reproduced from last year's report, where the sources of information are given in detail. The last column is taken from the preceding table:

Colony.	1896.	1897.	1898.	1899.	1900.
New South Wales	\$5,223,506	\$5,296,762	\$6,066,605	\$8,591,270	\$5,813,136
New Zealand.....	5,068,109	4,770,158	5,259,183	7,363,856	7,005,823
Queensland	10,906,493	12,424,861	16,017,860	13,811,706	13,975,172
South Australia	548,742	462,575	530,811	481,638	401,107
Tasmania	1,156,154	1,407,591	1,267,618	1,593,998	1,538,884
Victoria	15,671,824	15,821,303	16,298,045	16,633,697	15,528,710
Western Australia.....	5,201,351	12,482,461	19,420,732	30,845,416	29,236,039
Total	43,776,182	52,665,711	64,860,854	79,321,581	73,498,871

ESTIMATED PRODUCTION OF CRUDE GOLD IN AUSTRALASIA SINCE THE YEAR 1851.

[From returns furnished by the government of each colony.]

Year.	New South Wales.	New Zealand.	Queensland.	South Australia. ^a	Tasmania.	Victoria.	Western Australia.	Total.
1851-1884, inclusive	<i>Ounces.</i> 9,596,642	<i>Ounces.</i> 10,552,279	<i>Ounces.</i> 4,529,280	<i>Ounces.</i> 154,628	<i>Ounces.</i> 378,413	<i>Ounces.</i> 53,023,985	<i>Ounces.</i>	<i>Ounces.</i> 78,235,227
1885	103,736	237,371	310,941	18,327	37,317	735,218	.....	1,412,910
1886	101,416	226,668	340,998	21,115	31,014	665,396	302	1,386,909
1887	110,288	203,869	425,923	37,371	41,751	617,751	4,873	1,411,826
1888	87,503	201,219	481,643	16,763	39,610	625,026	3,493	1,455,257
1889	112,948	203,211	739,103	20,833	33,050	614,839	15,493	1,739,477
1890	127,460	193,193	610,587	24,831	20,510	588,560	22,806	1,587,917
1891	153,335	251,996	561,641	28,700	48,769	576,399	30,311	1,651,151
1892	156,870	237,392	605,612	38,974	43,278	654,456	59,518	1,796,130
1893	179,288	226,811	616,940	33,820	37,687	671,126	110,891	1,876,563
1894	324,787	221,615	675,000	35,844	57,873	716,955	207,131	2,239,205
1895	360,165	293,491	623,000	47,343	59,964	740,086	231,513	2,355,562
1896	296,071	263,722	638,000	29,004	62,586	805,087	281,265	2,375,735
1897	292,217	251,645	807,928	29,764	60,646	812,765	674,994	2,929,959
1898	340,494	280,175	920,048	49,372	69,549	837,258	1,050,183	3,547,079
1899	509,418	389,558	946,771	32,990	83,992	854,500	1,643,876	4,461,105
1900	345,650	371,993	963,189	29,397	81,175	807,407	1,580,950	4,179,761
Total.....	13,198,288	14,606,208	14,796,604	649,076	1,187,184	64,346,814	5,917,629	114,701,803

SILVER.

ESTIMATED PRODUCTION OF SILVER LEAD, SILVER ORE, AND SILVER BULLION IN AUSTRALASIA, TO THE YEAR 1900, INCLUSIVE.

[From returns furnished by the government of each colony.]

I.—SILVER LEAD AND SILVER ORE.

Year.	New South Wales.		Queensland.		Tasmania.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1851-1884, inclusive....	<i>Tons.</i> 9,507	£249,400	<i>Tons.</i> 10,159	£117,957	<i>Tons.</i> .....	.....	<i>Tons.</i> 19,666	£367,357
1885	2,286	107,626	3,787	63,711	.....	.....	6,073	171,337
1886	4,802	294,485	1,631	52,797	.....	.....	6,433	347,282
1887	12,530	541,952	2,183	80,092	.....	.....	14,713	622,044
1888	29,842	1,075,737	1,190	44,015	.....	.....	31,032	1,119,752
1889	81,514	1,899,197	1,104	61,500	.....	.....	82,648	1,960,697
1890	129,039	2,667,144	1,913	56,639	.....	.....	130,952	2,723,783
1891	147,780	2,484,739	875	21,879	.....	.....	148,655	3,506,618
1892	133,355	2,420,952	.....	.....	.....	.....	133,355	2,420,952
1893	214,620	2,953,589	.....	.....	15,710	£188,520	230,330	3,142,109
1894	180,326	2,195,339	.....	.....	20,572	246,864	200,898	2,442,203
1895	219,880	1,560,813	.....	.....	20,553	246,636	240,433	1,807,449
1896	286,736	1,758,933	.....	.....	21,167	229,662	307,903	1,988,595
1897	189,018	1,681,528	.....	.....	18,364	206,595	207,382	1,888,123
1898	398,568	1,644,777	.....	.....	15,320	188,892	413,888	1,833,669
1899	444,626	1,993,744	.....	.....	31,519	250,331	476,145	2,241,075
1900	438,837	2,513,874	.....	.....	28,863	359,286	467,700	2,873,160
Total.....	2,923,296	29,043,829	22,842	498,590	172,068	1,916,786	3,118,206	31,459,205

ESTIMATED PRODUCTION OF SILVER LEAD, SILVER ORE, ETC.—Continued.

II.—SILVER BULLION.

Year.	New South Wales.	New Zealand.	Queens- land.	South Aus- tralia.	Tas- mania.	Vic- toria.*	Total.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
1851-1884, inclusive	935,384	447,923	.....	.....	.....	280,991	1,664,298
1885.....	794,173	16,624	.....	.....	.....	28,951	839,748
1886.....	1,015,433	12,108	.....	.....	.....	26,422	1,053,963
1887.....	177,307	20,809	.....	.....	.....	26,321	224,437
1888.....	375,063	403	.....	.....	.....	27,331	402,797
1889.....	416,895	24,105	.....	.....	12,000	30,281	483,281
1890.....	496,552	32,627	.....	.....	.....	25,966	555,145
1891.....	729,590	28,023	.....	10,000	202,797	30,039	1,000,449
1892.....	350,661	22,053	203,680	.....	177,445	35,857	789,696
1893.....	531,972	63,076	339,267	.....	.....	40,941	975,256
1894.....	846,822	54,177	163,410	.....	.....	50,909	1,115,318
1895.....	550,142	85,024	223,759	.....	.....	50,647	909,572
1896.....	202,789	94,237	279,300	.....	.....	52,975	629,301
1897.....	150,005	183,892	234,065	.....	.....	69,633	637,595
1898.....	533,059	293,851	104,021	.....	.....	83,756	1,014,687
1899.....	692,036	349,858	145,325	.....	.....	85,687	1,272,906
1900.....	774,203	311,136	112,990	.....	.....	58,163	1,256,492
Total	9,572,086	2,039,926	1,805,817	10,000	392,242	1,004,870	14,824,941

* Extracted at Melbourne mint.

The silver production of Australasia for 1900 is given by the same authority as follows:

Colony.	Silver.	Silver lead.	Silver ore.	Total value.
	<i>Crude ounces.</i>	<i>Statute tons.</i>	<i>Statute tons.</i>	
Western Australia	28,749	.....	.....	£3,594
New South Wales.....	774,203	17,928	420,910	2,604,117
Queensland	112,990	.....	.....	12,712
Tasmania .....	.....	26,564	.....	279,372
South Australia.....	.....	(?)	26	18,046
New Zealand	311,136	.....	.....	35,390

The quantities for Western Australia, Queensland, and New Zealand are given in crude ounces of unknown fineness; the fine ounces have therefore been computed at this Bureau from the estimated value given by the department of mines, at the rate of \$0.62 per ounce fine. For New South Wales, however, which is the chief silver producer among the States of the Commonwealth, the values of silver, silver lead, and silver ore are included in one total, of which the value of lead forms a not unimportant item. In the absence of any official estimate of the fine silver contents of the several products, the computation made at this Bureau is based on the semiannual reports and statements of account of the Broken Hill Proprietary Company, Limited, which furnishes the larger part of the silver product of the State.

The silver and lead contents of the ore and silver-lead bullion are shown in the following table:

Material treated.	Treated in the refinery.	Finished product, per ton.	
		Silver.	Lead.
I. Silver ore:			
Half year ending—	<i>Tons.</i>	<i>Ounces.</i>	<i>Per cent.</i>
May 31, 1900	121,786	18.7	13.6
Nov. 30, 1900.....	129,951	20.3	15.2
Total for the year.....	251,737	19.5	14.4
II. Silver-lead:			
Half year ending—			
May 31, 1900	16,036	145	96.5
Nov. 30, 1900.....	22,553	130	93.3
Total for the year.....	38,589	136	94.4

The report of the Broken Hill Proprietary Company for the half-year ending November 30, 1900, gives the highest and lowest price for silver and lead for the year, as shown in the following table :

	Silver, per ounce, standard.	Lead, per ton.
Highest	s. d. 2 6 ³ / ₁₆	£17 ⁷ / ₈
Lowest	2 2 ¹ / ₁₆	16
Average	2 4 ⁹ / ₁₆	16 ¹ / ₂

Applying the average rates and prices for the year to the official figures for New South Wales, given above, we obtain the following table :

Source.	Silver.		Lead.	
	Per ton.	Total.	Per cent.	Total.
	<i>Ounces.</i>	<i>Ounces.</i>		
From silver ore	19.5	8,207,745	14.4	60,611
From silver-lead	136	2,438,208	94.4	16,924
Silver bullion		774,203		
Total		11,520,156		77,535

Value: Silver, £1,370,942; lead, £1,313,266; total, £2,684,208.

The total value thus arrived at varies by only 3.08 per cent from that given by the department of mines. Considering that the highest price of silver is 12 per cent above the lowest, and the highest price of lead 10.4 per cent above the lowest, a variance of 3 per cent in the total result may be disregarded as immaterial: It further appears from the foregoing calculation that the quantity of silver is stated in standard ounces. This gives a fine product of 10,656,144 ounces. As the approximation allows of an error of 3 per cent or more, the last five places are omitted and the product is estimated, in round figures, at 10,600,000 fine ounces, which is nearly the same as the estimated output for 1899 (10,500,000 fine ounces, in round numbers).

In the absence of any basis for a similar calculation for Tasmania and South Australia, the value is provisionally assumed to represent only silver, subject to correction upon more accurate information.

The estimated production of Australasia is given in the following table:

ESTIMATED SILVER PRODUCT, 1900.

Colony.	Quantity.	Commercial value.	United States coining value.
	<i>Fine ounces.</i>		
West Australia	28,210	\$17,490	\$36,474
New South Wales	10,600,000	6,572,000	13,705,050
Queensland	99,779	61,863	129,007
Tasmania	2,192,845	1,359,564	2,835,193
South Australia	141,647	87,821	183,140
New Zealand	277,782	172,225	359,152
Total	13,340,263	8,270,963	17,248,016

Joining the estimates given in the foregoing table to those arrived at for the preceding two years, we obtain the following table:

PRODUCTION OF FINE SILVER.

Colony.	1898.	1899.	1900.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
New South Wales.....	8,802,600	10,522,488	10,600,000
Victoria.....	57,100	58,439	.....
Queensland.....	54,700	127,381	99,779
South Australia.....	4,900	.....	141,617
Tasmania.....	1,400,600	1,825,323	2,192,845
New Zealand.....	171,200	203,967	277,782
West Australia.....	.....	.....	28,210
Total Australasia.....	10,491,100	12,737,598	13,340,263

The following communication was received from the United States consul at Melbourne.

CONSULATE-GENERAL OF THE UNITED STATES,
Melbourne, Australia, November 28, 1900.

SIR: I have the honor to report, for the information of the Treasury Department, that from January 1 to November 28, 1900, the following shipments of gold have been made from Australia:

From Melbourne, Victoria.....	\$12,134,817
From Sydney, New South Wales.....	22,617,345
From West Australia.....	18,061,205
From Adelaide, South Australia.....	246,608
Total to date, 1900.....	53,059,975
Total to date, 1899.....	50,540,017
Increase.....	2,519,958

I am, sir, your obedient servant,

JOHN P. BRAY,
United States Consul-General.

HON. DAVID J. HILL,
Department of State.

AUSTRALIAN GOLD MINING.

[From The Mining World and Engineering Record, London, March 2, 1901.]

In recent issues we have dealt at length with the progress made by the gold-mining industries of Westralia and New Zealand during the past year, and it now only remains, in finishing our series of reviews for the last year of the century, to refer to the results obtained from gold-mining operations in the other Australasian colonies. As our readers are aware, British capital has been—in the last twenty years, at all events—much more largely employed in the development and working of Queensland mining undertakings than in similar enterprises in the other colonies, and it is, therefore, satisfactory from the insular point of view that the production of the precious metal in Queensland was more satisfactory last year than in the preceding twelve months.

In dealing with the Westralian and New Zealand figures we had to refer to a substantial falling off in the output of gold, and from the subjoined table it will be observed that decreases were also exhibited in Victoria, New South Wales, and

South Australia, while the improvement in the case of Queensland amounted to 4,500 ounces.

Colony.	1899.	1900.	Increase (+) or decrease (-).
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
West Australia	1,643,873	1,580,950	- 62,923
Queensland	946,600	951,100	+ 4,500
Victoria	854,500	807,407	- 47,093
New Zealand.....	389,814	369,521	- 20,293
New South Wales.....	496,196	345,650	-150,546
South Australia	32,990	29,397	- 3,593
Tasmania.....	88,992	89,500	+ 508
Total	4,452,965	4,173,525	-279,440

From this table it will be observed that the aggregate output of gold from the several colonial districts exhibited a decrease of 279,440 ounces, and of this considerably more than one-half represented the shrinkage in the New South Wales contribution. It is curious that the value of the gold output of New South Wales should have declined to the extent of nearly £600,000 in the twelve months, in view of the fact that the general position of the colony has improved, and capital has been comparatively cheap and abundant. The experience of Victoria has also been unsatisfactory, though to a less extent than New South Wales; but, notwithstanding the severe drought in Queensland, which has at times greatly interfered with mining operations, the output has continued to increase, although only to a slight extent.

PRODUCTION OF SILVER.

[From a Statistical Account of the Seven Colonies of Australasia, 1899-1900, by T. A. Coghlan, statistician of New South Wales, p. 561.]

The Broken Hill Proprietary Company hold the premier position. They have at Port Pirie, in the neighboring colony of South Australia, a complete smelting plant on the latest and most approved principles, and have enlisted the services of competent managers, whose experience has been gained in the celebrated silver-mining centers of the United States. From the commencement of mining operations in 1885 to the end of May, 1899, the company treated 4,125,729 tons of silver and silver-lead ores, producing 98,558,617 ounces of silver and 385,793 tons of lead, valued in the London market at £20,560,959.

Dividends and bonuses to the amount of £6,968,000 have been paid, besides the nominal value of shares from the several "blocks." The sum spent in the erection and construction of plant, from the opening of the property, has been about £991,680.

NEW SOUTH WALES.

[From the Board of Trade Journal, London, April 11, 1901.]

The board of trade have received from the office of the agent-general for New South Wales the following particulars of the gold returns of that colony for the year 1900: Gold production of New South Wales in 1900, 345,650 ounces; value, £1,194,521.

COST OF PRODUCTION OF SILVER.

The reports and statements of accounts of the Broken Hill Proprietary Company, Limited, for the half years ending May 31 and November 30, 1900, furnish interesting material upon the question of cost of production of silver.

Silver is recovered by the company from silver-lead ores containing quantities of other metals. Any attempt to determine the cost of silver alone must, therefore, be more or less arbitrary, inasmuch as the working costs are distributed over all the products. Still, an idea of it may be formed if the amount realized from the sale of all other

products is deducted from the total cost and the balance is assumed to represent the cost of silver.

The working account of the company, including wages, salaries, and expenses of mining, quarrying, smelting, concentrating, chloridizing, lixiviation, roasting, refining, assaying, freight, insurance, wharf expenses, horses and drays, electric light, coke and coal, water, and a number of incidentals, was as follows:

For the half year ending—	£	s.	d.
May 31, 1900.....	468,310	18	6
November 30, 1900.....	532,241	5	11
For the year.....	1,000,552	4	5

The amount realized from the sale of all products except silver is shown in the table following:

From what extracted.	Half year ending—			
	May 31, 1900.		Nov. 30, 1900.	
	£	s. d.	£	s. d.
Lead.....	260,238	16 7	289,589	3 0
Other products.....	28,989	11 9	26,412	8 6
Refinery surplus received.....	29,264	5 9	16,687	5 8
Refinery surplus to be received.....	9,500	0 0	6,000	0 0
Total.....	327,992	14 1	338,688	17 2

When these amounts are deducted from the expense accounts for the respective half years the following estimates are obtained for the cost of silver:

For half year ending—	£	s.	d.
May 31, 1900.....	140,318	4	5
November 30, 1900.....	193,552	8	9
For the year.....	333,870	13	2

The fine-silver products for the same period, as given in the reports, and the cost per ounce, computed as above explained, are presented in the following table:

	Quantity.	Cost per ounce.
	Ounces.	d.
For half year ending—		
May 31, 1900.....	2,320,172	14.5
November 30, 1900.....	2,946,144	15.8
For the year.....	5,266,316	15.2

The price of silver per ounce, fine, stood on May 31, 1900, at 29½³/₁₆d. and on November 30, 1900, at 32½¹/₁₆d., according to which the gross profit on silver produced by the Broken Hill Proprietary Company was, in round figures, 100 per cent of the cost price at current London quotations for silver.

NEW ZEALAND.

GOLD MINES.

[From the Mining World and Engineering Record, London, February 9, 1901, p. 213.]

The gold production in New Zealand last year was smaller than in the preceding twelve months. The amounts of the output, month by month, are shown in the following table for the past three years:

Month.	1900.	1899.	1898.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
January	38,289	33,249	25,763
February	18,125	21,729	22,278
March	39,165	36,843	24,467
April	20,353	33,343	15,220
May	29,095	25,962	15,444
June	33,833	41,547	35,898
July	39,678	25,838	17,891
August	23,774	38,531	34,446
September	41,873	29,693	14,306
October	33,617	36,577	30,039
November	17,739	26,829	16,721
December	34,000	39,673	30,743
Total	369,521	389,814	283,216

DREDGING FOR GOLD.

By Capt. C. C. LONGRIDGE, M. Inst. M. E., M. I. Mech. E., etc.

[From the Mining World and Engineering Record, London, April 13, 1901.]

WORKING COSTS.

The difficulties of ascertaining costs in any mining business are almost insuperable. This arises partly from the unnecessary secrecy maintained by those conducting such operations and partly either from the absence of methodical bookkeeping or from the want of uniformity in debiting charges—unfortunate facts to which the author has on other occasions drawn attention. Accordingly, the few data here given are far from satisfactory, for though the capacity of the dredger and the working expenses per week are stated, neither the number of hours run nor the total number of cubic yards dredged nor the items included in the expenses can be ascertained. With this provision, the following statistics are offered:

The official Report of the Mining Industry of New Zealand for 1893 (Mining Journal, December 26, 1896, et seq.; West Australian Mining Reports of 1896, Mining Reports, etc.), page 128, states: “It is found that the working expenses of the dredges, for the quantity of material lifted, is not more than the expense of working ground with an hydraulic elevator.”

The estimated weekly cost of working the Welman suction dredge *Waipapa* (Reports on the Mining Industry of New Zealand, 1890, p. 89), raising, say, 30 cubic yards per hour, or, say, 4,000 cubic yards per week, including manager and 11 hands, wear and tear (this is mostly about the buckets; lips last from one to two years, and the pins on which the buckets are hinged about three months), and 18 cords of rata firewood, were £70. In other words, the operating expenses were 4.5d. per cubic yard.

The working expenses of the Dunedin bucket dredge (Reports on the Mining Industry of New Zealand, 1893, p. 205), with a capacity of 106 cubic yards per hour, were £250 per month, or £62.5 per week; being £160, wages of 9 men and a dredge master; £30 for coal, at 55s. per ton delivered, and £60 for repairs and supplies. The average of steady work being only four days per week of six working days, the weekly costs would in this case be £58 for an hourly capacity of 1 cubic yard. Assuming the dredge to work night and day, but deducting 25 per cent for stoppages, unfilled buckets, etc., the total material dredged in the week of four days would be $10,176 - 2,544 = 7,632$ cubic yards, at a cost of £62.5, representing 1.9d. per cubic yard as the working expenses, as against 4.5d. in the suction dredge above mentioned.

The costs of the *Golden Treasure* bucket dredge (Reports on the Mining Industry of New Zealand, 1895, p. 153), made by Marshall & Sons, Gainsborough, England, with a capacity of 60 cubic yards in steady work, are stated to have been about £36, equivalent to £6 for an hourly capacity of 1 cubic yard. Two men per shift were employed, and the quantity of lignite coal used was about 1 ton per shift. Assuming the dredge to work continuously for four days a week, the operating costs would be 3d. per cubic yard.

The working costs on the Hyde & Woods bucket dredge (Reports on the Mining Industry of New Zealand, 1896, p. 154), raising on an average 32 cubic yards per hour, were rather over £30 per week. Six men were employed to work the dredge day and night, and the amount of local coal burned was about 3 tons per twenty-four hours. On the same assumption as to the number of days' work, this represents a cost of 3.16d. per cubic yard.

In the two bucket dredges of the Electric Gold Dredging Company (Reports on the Mining Industry of New Zealand, 1897, p. 139), Kawaran River, dredging, respectively, 70 and 90 cubic yards per hour, the united costs are £100 per week. Thirteen men are employed on the dredges. Assuming the same conditions as before, the working costs would be slightly over 2d. per cubic yard.

The Jutland flat dredge *Waipori* dredged 74 cubic yards per hour, at a cost of 1.55d. per cubic yard, including all stoppages, repairs, and expenses.

Mr. Jaquet, in Notes on Gold Dredging, 1898, gives the weekly costs of running in New Zealand a large dredge, raising, say, 90 cubic yards per hour, as follows:

	£.	s.
Fuel (16 tons of lignite at 12s.)	9	12
Labor (5 men at £3 and 1 at £5)	20	0
Repairs, office expenses, etc	20	0
Total	49	12

which, on the same assumption as before, represents 1.6d. per cubic yard

It is claimed for the Yuba River dredge, California (Report of the Minister of Mines in British Columbia, 1897, pp. 495, 496), built by the Risdon Iron Works, with a gross capacity of 93 cubic yards per hour, that for any ground not deeper than 60 feet below water level or more than 20 feet above, and not containing bowlders of more than 1 ton weight, the material can be handled at from 3 to 5 cents (1½d. to 2½d.) per cubic yard. If the capacity of this machine is given without deduction for water raised, imperfect filling, and general delays, an increased volume of the gravel when broken up by the buckets, the actual working capacity would be less and the costs of operating would be proportionately greater.

On the *A. E. Graeter*, Montana, United States of America, with an output of about 60 cubic yards per hour, the cost of working gravel by steam power has been found to be 9 cents (4½d.) per cubic yard; but on the *F. L. Graves*, where electricity is employed for power, this cost has been 4½ cents (2¼d.) per cubic yard. ("Gold dredging in Montana," by E. B. Braden, Engineering and Mining Journal, November 20, 1897, p. 695.)

The above figures indicate, first, that the cost of operating bucket dredges by steam power decreases as their size increases. This is chiefly due to the relatively lower wages, the labor being about the same whether the quantity raised be 20 or 100 tons per hour; secondly, that in bucket dredges of large capacity the cost of dredging ranges from 1½d. to about 3d. per cubic yard, and probably averages about 2d. "Ordinary ground," say the Risdon Iron Works (Catalogue No. 16, second edition, 1898, p. 4), "can be handled by the new improved dredge at from 3 cents (1½d.) per cubic yard, and ground can be handled from 60 feet below the water level to 20 feet above at a cost which, it is claimed, is less than that of any other known process."

On L. Gard's No. 2 dredge, which is a current wheeler, working in midstream and lifting from 35 to 40 tons per hour and employing one man per shift, the average cost of working is £14 per week. Taking 30 cubic yards as the average output and making the usual assumption, this works out at 0.97d., or under 1d. per cubic yard—a very low figure.

A writer in the New York Engineering and Mining Journal recently stated: "Under favorable circumstances, and when working continuously, a large bucket dredge will lift and treat 1 cubic yard (loose measurement) for about 1d., but the average cost is probably nearly double this."

The working costs given above show the average expense of operating a steam bucket dredge in New Zealand, and perhaps elsewhere, amounts to 2d. per cubic yard raised. As, however, there are, in public company management, standing charges which are not included in this figure, it will be safer to consider the average full working costs in most parts of the world to be about 2½d. per cubic yard.

Allowing 75 per cent as the probable extraction, it follows that ground to be payable should contain in most cases 3½d., or, say, rather 1½ grains, of gold per cubic yard. This estimate agrees with the other facts of which the author has cognizance. In 1892-93 the Waipari Gold Dredging Company was working a dredge raising 5,000 cubic yards per week. The average yield was 1.47 grains of gold per cubic yard, and this seems to have been on the margin line between profit and loss.

Other instances of a like nature could be cited. There are, of course, cases where 1 grain of gold suffices to pay expenses and yield a profit, but, on the other hand, there are also cases where a much higher value is needed.

CAPACITY AND COST OF DREDGING.

As the working costs relatively decrease in proportion as the output is increased, it is clearly advantageous to lift as large a quantity of material as possible. But, on

the other hand, it is waste of power to raise more material than can be properly treated. Hence the capacity of a dredge should be fixed by that of the gold-saving appliances. In other words, the capacity of a dredge is governed by the space at disposal for gold saving. In accordance with this principle, practical experience is mostly in favor of limiting the capacity of the dredge to from 80 to 100 cubic yards per hour, or, say, 2,000 to 2,500 cubic yards of material per day of twenty-four hours. If more gravel has to be handled, it is better to employ two or more dredges. The total weight of a dredge of this description with all machinery is about 200 tons. The rate of discharge is about 12 to 15 buckets per minute.

It must be remembered that the amount of wash lifted by a dredge varies greatly. As a rule, the maximum is attained in large and deep deposits where there is abundant material. But only in such ground, or where a dredge is working against a high face, the gravel of which falls readily into the buckets, is the theoretical capacity nearly attained. For instance, with fairly loose gravel of 12 or more feet in depth and not less than 10 feet below water, on a soft bottom, 4½ cubic foot buckets might be expected to work up to seven-eighths of their full capacity. In most cases, especially when working shallow and hard ground, the actual dredge output is perhaps about 50 to 60 per cent of the theoretical capacity. Where a dredge is scraping along or cleaning up a rocky bottom, with but a thin layer of wash on it, the capacity will be very much lower, for the buckets may be frequently checked by obstacles and may come up almost empty. In such ground an average output might be 33 per cent of the theoretical capacity. In bad ground, where, for instance, a 5 to 10 foot layer of wash lies on an uneven ratty clay bottom, consisting of rough boulders up to 4 or 5 tons in weight, all very tightly packed together and set with small gravel, the bucket capacity would be only about one-fifth or one-sixth of this theoretical amount.

The size of dredge to be employed on a given claim depends largely on the depth of wash dirt to be dredged. If this is shallow—under 20 feet—a small dredge costing £3,000 to £5,000 is best suited for the work, and would pay where a large dredge might be a failure. For dredging ground up to 35 feet in depth a £5,000 to £8,000 dredge would suffice. The largest dredges built have cost £8,000 to £10,000, and are capable of dredging to over 50 feet.

QUEENSLAND MINERALS IN 1900.

[From The Mining World and Engineering Record, London, May 18, 1901.]

Silver.—Of minerals other than gold the actual production was small in 1900 and gives little idea of the latent wealth of the colony. Thus the total yield of silver—145,000 ounces, valued at £15,000—came from two small mines, one in the Stanthorpe and the other in the Ravenswood district. But the galena lodes of the Burketown mineral field are shown by the recently published report by Mr. Cameron, of the geological survey staff, to be well worthy of the trial which they will no doubt receive when reasonable means of carriage to the coast are provided.

WESTERN AUSTRALIA.

The following table has been prepared at this Bureau from data given in the Statistical Register for the Year 1899 (pp. 10 and 46):

GOLD PRODUCTION.

Year.	Production.		Number of dividend-paying companies.	Dividends paid.		
	Quantity.	Value.		Amount.	Percentage of value of production.	Per ounce.
	<i>Ounces.</i>					<i>£. s. d.</i>
1890	22,806	£86,664	1	£1,250	1.4	0 1 1
1891	30,310	115,183	2	5,326	4.6	0 3 6
1892	59,549	226,284	1	1,875	.8	0 0 8
1893	110,892	421,385	3	34,350	8.1	0 6 2
1894	207,130	787,099	5	110,642	14	0 10 8
1895	231,513	879,748	9	82,183	9.3	0 7 1
1896	281,265	1,068,808	7	168,216	15.7	0 11 11
1897	674,994	2,564,977	18	507,732	19.8	0 15 0
1898	1,050,184	3,990,697	17	606,124	15.2	0 11 6
1899	1,643,877	6,246,732	25	2,057,421	32.9	1 5 1
Total				3,575,119		

It appears from this table that the returns from western Australian mines are very irregular. In general, the dividends grow apace with the production. The highest dividends have been declared by three companies—the Great Boulder Proprietary Gold Mining Company, Hannan’s Brown Hill Gold Mining Company, and the Lake View Consols Gold Mining Company.

The dividends paid by these three companies amount to more than one-half of all the dividends paid by the gold mines of the colony, and have within the short space of five years fully repaid the capital invested and yielded handsome profits, as shown in the following table:

Name of company.	Capital paid up.	Dividends paid.	
			<i>Per cent.</i>
Great Boulder Proprietary	£175,000	£763,059	436
Hannan’s Brown Hill.....	140,000	250,625	179
Lake View Consols.....	250,000	880,000	352
Total		1,893,675	.....

There were, on December 31, 1899, 23 companies whose nominal capital had been fully paid up, the average being £345,966 per company. Thus it is seen that the three best dividend-paying companies ranked below the average as to investment.

WESTERN AUSTRALIAN GOLD FIELDS.

[From the Supplement to Government Gazette of Western Australia. Perth, February 4, 1901.]

Return, in ounces, showing the gross weight of gold reported to the mines department, 1,514,237 (total gross weight).

The difference between the statement headed “Return, in ounces, showing the gross weight of gold reported to the mines department” and the one compiled by His Majesty’s customs is to be accounted for by the fact that the exportation of gold started, practically, with the inception of the industry, whereas the mode of collecting returns adopted by the mines department is the elaboration of a system established some few years ago. Up to that date, therefore, no good basis for an exact comparison can be found. As to the discrepancy which exists at present, the assumption is that the whole of the gold won from the soil is not reported to the department.

A summary of the gold exported and received at the royal mint during the years 1898 and 1899, compared with the yield reported to the mines department, is found in the following table:

Year.	Export and mint.	Reported yield. ^a	Difference.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
1898.....	1,050,184	1,041,712	8,472
1899.....	1,643,877	1,600,763	43,114

^a By mines department.

The reported yield for 1898 is 0.81 per cent short of the total obtained from the returns of the collector of customs and the Perth branch of the royal mint for the same year. For 1899 the discrepancy amounts to 2.63 per cent. According to the report of the department of mines the discrepancy may, to a great extent, be accounted for as follows:

Returns are collected by the department from all owners of registered mining holdings, but there are a large number of men working alluvial claims which need not be registered at the various wardens’ offices, and of which the department has no

knowledge. The gold won from these holdings is usually purchased by banks and gold dealers, and taken in small parcels by storekeepers in exchange for goods. So far it has been found impossible to obtain reliable returns of gold purchased. In addition to gold produced from unregistered claims, a certain amount of stolen gold is unaccounted for. As practically the whole of this gold, with that obtained from the regular producing mines, finds its way to the mint and the customs, the total output as obtained from these sources may be considered as the correct one for the colony as a whole.

The gold production is arrived at by taking the figures furnished by the export and mint returns.

[From Statistical Register, 1899, Part VII, p. 10.]

The disposition of the gold product of 1899 is shown in the following table, taken from the Statistical Register for 1899, published in the current year 1901:

Disposition:	Ounces.
Received at the Perth mint	209, 306
Exported to—	Ounces.
Victoria	514, 199
New South Wales	161, 333
South Australia	48, 452
Queensland	167
United Kingdom	710, 258
Germany	162
Total exports	1, 434, 571
Grand total	1, 643, 877
Value, £6,246,732.	

GOLD.

[From The Mineral Wealth of Western Australia. Perth, 1900.]

The auriferous deposits of western Australia have been responsible for the 4,127,374 ounces of gold, valued at £15,684,022, which have been exported. The relations which these deposits, one of the factors of the colony's prosperity, bear to the broader geological features naturally take a prominent place in any account dealing with its mineral resources. The method adopted in dealing with the auriferous deposits is to describe each gold field separately, giving a brief aperçu of its salient features, although the information available for this purpose is, in one or two cases, much more fragmentary than could be wished. It has been found most convenient to adhere to a strictly geographical order in description, beginning with the field at the northern extremity of the colony. The description of each field is followed by a table, giving the yield of gold as shown by the figures furnished to the department of mines and by the data in the archives of His Majesty's customs house. It will be noticed that in all cases there is a difference between the two sets of figures. Up to the end of 1899 there have been officially reported to the mines department 3,850,332 ounces of gold from the various fields of the colony. The customs authorities, however, give 4,127,374 ounces as that entered for export, being 277,042 ounces in excess of the figures furnished to the mines department. The discrepancy is to be accounted for by the difficulty experienced in obtaining a record of the alluvial gold, and also by the fact that a good deal of the gold won in the early days was probably never officially reported. Writing in 1899, the warden of Yilgarn notes, with reference to the output of gold from that district, that a good deal of gold leaves the field and is not recorded.

PURITY OF WESTERN AUSTRALIAN GOLD.

In order to calculate the value of the exports of the colony, the customs authorities have assumed an average value of £3 16s. per ounce, or a fineness of 0.8947 for all the gold bullion turned out by the various mines. Seeing, however, that the purity of this bullion depends not only on the purity of the metal in the ore, but also upon the nature of the other minerals in it, the method of extraction, and the degree to which the refining process is pushed at the mine, this factor gives but little idea of the original fineness of the metal.

[Condensed from an article by H. Kuss, in *Annales des Mines*, January, 1901, pp. 47-69.]

An article in *Annales des Mines* (published under the authority of the French ministry of public works) contains valuable information on the gold-mining industry of western Australia.

From figures furnished by several of the more important mines in their annual reports for 1899 to their stockholders, the average cost of mining and milling, including an allowance for development work and depreciation, and the average yield of fine gold per ton were as follows:

	Cost per ton.	Fine gold per ton.	Value at United States coin- ing rate.
		<i>Grams.</i>	
Great Boulder Proprietary	\$10.80	48	\$31.90
Ivanhoe	8.93	48	31.90
Golden Horseshoe	10.39	81	53.83
Lakeview Consolidated	9.13	85	56.49

The average yield for the Kalgoorlie district amounted to 51 grams fine per ton. The average for the colony amounted to 36.45 grams per ton. That the productivity of these mines is extraordinarily high is shown by comparison with the Transvaal, where the yield per ton does not exceed 15 grams, except in the two best paying mines, viz, Robinson and Ferreira.

The total number of stamps was 3,338, of an aggregate capacity of 4,000,000 tons per year, which far exceeded the actual needs, the total quantity treated in 1899 amounting to but 1,174,219 tons.

A slight decrease in the productivity of the mines is noticed, viz, the average yield per ton from the opening of the mines to and including 1898 amounted to 37.22 grams; in 1899, to 36.45 grams, and during the first half of 1900, 32.67 grams. This downward tendency is in part compensated by better results obtained to-day from a more complete cyanidization of the tailings.

Besides the product of regular mining operations, quantities of gold are produced by numerous gold seekers scattered all over the country. The product from this source, which is by no means a negligible quantity, does not figure in the mining statistics, but it reappears in the returns of the customs department and the mint. Some idea of the importance of this source may be gathered from the following figures:

The total number of hands employed at the gold mines was 16,080, while the number of prospectors and gold seekers scattered over the colony is estimated at 4,920. It is known that these gold seekers dig the surface sands for gold. Sometimes they discover paying wash gold of considerable value. As a rule, however, they are barely eking out an existence, and sometimes live very miserably. They pay a dear price and work hard for their independence, which they prefer to much more remunerative regular work in the mines.

COST OF GOLD MINING.

[Quoted from the Supplement to the Mining World and Engineering Record, May 25, 1901, p. 858.]

At the seventh annual meeting of the Great Boulder Proprietary Company, held in London on May 23, 1901, the chairman of the company, in the course of his report for the year ending December 31, 1900, gave out the following figures concerning the costs of working per ton :

“Our latest costs are as follows: (they are the costs as cabled for the month of April): Stoping or extracting ores, 8s. 11d. per ton; battery, the gold extraction, 11s. 8d. per ton; sulphide mill, gold extraction, 18s. 7d. per ton; cyaniding tailings and slimes, 9s. 6d. per ton; general expenses, 5s. 1d. per ton; one-third development account, which we always put to one side, 4s. 4d. per ton. Throughout, therefore, you will see the reductions have been very substantial. The ore, therefore, for April of this year passed through the battery cost in total 30s. per ton, compared with 40s. 1d., shown by the revenue account of last year, which I think highly satisfactory and important. The ore treated in the sulphide mill cost, exclusive of cyaniding the residues, 36s. 11d. per ton in April of this year, compared with 54s. 11d. for the last five months of 1900. This reduction of so much as 18s. per ton, I repeat again, is highly satisfactory and reflects great credit on the management. I might say here that the estimates of cost have more than verified the figures given in our interim report of January and February. They were then stated at 45s., but they were certainly less, and in April they were only 36s. 11d. The treatment of the tailings or residues does not materially alter in cost, being 9s. 6d. as against 9s. 2d.

SOURCES OF GOLD PRODUCTION AND AVERAGE RESULTS.

[Compiled from The Seven Colonies of Australasia, 1899-1900, pp. 558, 559.]

SOURCES OF THE GOLD PRODUCTION, 1899.

Colony.	Weight.			Per cent of total for colonies.	
	Alluvial.	Quartz.	Total.	Alluvial.	Quartz.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>		
New South Wales	91,477	404,719	496,196	18.4	81.6
Victoria	270,405	584,095	854,500	31.7	68.3
Queensland	21,794	925,100	946,894	2.3	97.7
Western Australia.....	63,208	1,580,669	1,643,877	3.6	96.4
Tasmania	11,513	72,479	83,992	13.7	86.3
Total	458,397	3,567,062	4,025,459	11.4	88.6

There is no information available for the distribution of the output of South Australia and New Zealand as to source of production.

The proportion raised in these colonies does not exceed, however, 9.9 of the total Australasia, and can affect the general average to but a small degree.

The average value of gold won by each miner is given below, but as the conditions under which mining is carried on are by no means the same in every colony, the figures, which vary considerably, may be somewhat misleading. It is probable that the number of gold miners in several of the provinces is largely overstated, otherwise the industry must be carried on at a great loss; and this will be the more apparent when it is remembered that a fairly large quantity of gold is obtained with other metals, the men employed at the working of which are not classified as gold miners. Most likely many of the men employ themselves in mining for only a portion of their time and devote the rest to more remunerative pursuits; but when full allowance is made on this score it will be evident that in some colonies at least the search for gold is not a profitable occupation. The small return for South Australia is due to the large number of Chinese engaged in the industry, many of them not possessing proper appliances for working the claims. The following table shows the number of miners at work in 1899, with the quantity and value of gold won per man:

Colony.	Miners em- ployed.	Average production of gold.			
		Quantity.	Value.		
	<i>Number.</i>	<i>Ounces.</i>	<i>£</i>	<i>s.</i>	<i>d.</i>
New South Wales.....	19,348	25.65	90	10	10
Victoria.....	30,114	28.38	113	10	0
Queensland.....	9,758	97.04	290	17	0
South Australia.....	1,986	11.64	39	16	0
Western Australia.....	21,000	78.28	297	9	3
Tasmania.....	1,296	64.81	252	14	8
New Zealand.....	13,291	29.31	113	17	0

The greatest development of quartz reefing is found in Victoria, some of the mines being of great depth. At the end of 1899 there were 7 mines in the Bendigo district over 3,000 feet deep and 14 over 2,500 feet deep. In the Lazarus mine a depth of 3,424 feet had been reached, and in Lansell's 180 mine 3,352 feet. On other fields there were 7 mines over 1,400 feet deep, the principal of which were the South Star mine, in the Ballarat district, where the shaft is down 2,520 feet, and the Magdala mine, in the Stawell district, where a depth of 2,410 feet has been reached.

The Broken Hill Proprietary Company hold the premier position. They have at Port Pirie, in the neighboring colony of South Australia, a complete smelting plant on the latest and most approved principles, and have enlisted the services of competent managers, whose experience has been gained in the celebrated silver-mining centers of the United States. From the commencement of mining operations in 1885 to the end of May, 1899, the company treated 4,125,729 tons of silver and silver-lead ores, producing 98,558,617 ounces of silver and 385,793 tons of lead, valued in the London market at £20,560,959.

Dividends and bonuses to the amount of £6,968,000 have been paid, besides the nominal value of shares from the several "blocks." The sum spent in the erection and construction of plant from the opening of the property has been about £991,680.

AUSTRIA-HUNGARY.

Official information received by this Bureau gives Austria's product of gold for 1900 at 225.342 kilograms of gold ore, valued at 42,831 crowns, and 25,000 kilograms of gold and silver bearing quartz, which contained about 17 grams gold per 1,000 kilograms. The value of this product in United States money was \$8,960.

The amount of silver ore produced from mines in Austria in 1900 was 21,640,500 kilograms, valued at 3,796,493 crowns, or \$769,169 (commercial value), representing, at the average price of silver during the year, viz, \$0.62 per ounce, fine, 1,240,596 ounces, or 38,595 kilograms, fine, of the coining value of \$1,604,003.

The product of the Hungarian mines for 1900 was 3,209.37747 kilograms of fine gold, with a value of \$2,132,952.

The silver product was 20,084.109 kilograms, at a redemption (commercial) value of 2,289,588.43 crowns, or \$463,871, representing 748,178 ounces, or 23,276 kilograms, fine, of a coining value of \$967,341.

The following table shows the product of both countries in condensed form:

GOLD.

Country.	Fine weight.		Value.
	<i>Kilos.</i>	<i>Ounces.</i>	
Austria	14	433	\$8,960
Hungary	3,209	103,182	2,132,952
Total	3,223	103,615	2,141,912

SILVER.

Country.	Fine weight.		Value.
	<i>Kilos.</i>	<i>Ounces.</i>	
Austria	38,595	1,240,596	\$1,604,003
Hungary	23,276	748,178	967,341
Total	61,871	1,988,774	2,571,344

BELGIUM.

PRODUCTION OF THE PRECIOUS METALS.

[Translated from the Report of the Belgian Commissioner of the Mint to the Minister of Finance and Public Works for 1900, p. 70.]

From 1872 to 1884 the Vieille Montagne Company extracted from the argentiferous galenas at Moresnet Mills an insignificant quantity of silver—30 kilograms a year, on an average. This production has been discontinued. Three refineries situated in the provinces of Liege and Lindbourg (at Bleyberg, Sclaigheaux, and Overpelt), are treating argentiferous ores of foreign origin. Within the thirty-five-year period from 1866 to 1900 the production of these establishments aggregated 552,559 kilograms of fine silver.

A fourth refinery, founded at Hoboken, near Antwerp, confines itself to extracting silver from lead ingots imported from Spain. Its production from 1888 to 1900 aggregated 829,785 kilograms.

In 1900 the total production amounted to 139,800 kilograms of silver.

The following figures for 1899 are taken from the *Statistique des Mines, Minieres, Carrieres, Usines Metallurgiques, etc., du Royaume de Belgique* for 1899:

Description.	Quantity.	Value.	Price.
Lead, crude.....metric tons..	15,727	<i>Francs.</i> 5,930,966	<i>Francs.</i> 377.12
Silver, crude.....kilograms..	134,854	15,380,600	144.05

The production of these refineries for the years 1894–1898 is given in the following table, quoted from *Statistique des Mines, Usines Metallurgiques, etc., du Royaume de Belgique*, 1898, p. 37:

Year.	Quantity.	Commercial value.
	<i>Kilograms.</i>	<i>Francs.</i>
1894	28,961	3,026,100
1895	31,543	3,430,000
1896	28,509	3,189,500
1897	30,073	3,157,109
1898	116,035	12,385,850

IMPORTS AND EXPORTS OF THE PRECIOUS METALS (CUSTOMS ENTRIES).

[From the Report of the Belgian Commissioner of the Mint to the Minister of Finance and Public Works for 1900, p. 71.]

GOLD.

Year.	Ore.	Bullion.	Coin.	Total.
	<i>Kilograms.</i>	<i>Kilograms.</i>	<i>Kilograms.</i>	<i>Kilograms.</i>
Importation:				
1870		15,100	5,000	20,000
1880		200	1,000	1,200
1890	10,700	2,900	300	13,900
1899	50	1,100	1,200	2,350
Exportation:				
1870		12,300		12,300
1880		100		100
1890		100	100	200
1899		500	1,600	2,100

IMPORTS AND EXPORTS OF THE PRECIOUS METALS (CUSTOMS ENTRIES)—Continued.

SILVER.

Importation:	Kilograms.	Kilograms.	Kilograms.	Kilograms.
1870		177,300	264,400	441,700
1880		28,300	1,400	29,700
1890	217,000	7,000	22,900	246,900
1899	2,522,900	105,700	306,800	2,935,400
Exportation:				
1870		37,400	6,200	43,600
1880		1,000		1,000
1890	900	5,300	21,100	27,300
1899	100	54,300	337,000	391,400

BOLIVIA.

According to the report of the German imperial consul at Cochabamba, reproduced at length below, the gold production of Bolivia in 1898 and 1899 was officially stated at 550 and 546 kilograms, respectively, of an estimated fineness of 22 carats (0.916 $\frac{2}{3}$). This corresponds to 504 kilograms, or 16,204 ounces fine, of the value of \$334,958, for 1898, and 500 kilograms, or 16,075 ounces fine, of the value of \$332,300, for 1899.

In the absence of information for 1900, the figures for 1899 are repeated.

The fineness of the silver product is not stated. The product of 1898 is estimated at 342,138 kilograms. Our own returns from Bolivia gave a commercial value for the same year corresponding to 337,355 kilograms fine (see last year's report, p. 271). The divergence between the two sources amounts to somewhat over 1 per cent and may be disregarded as immaterial. The agreement between the two sources vouches for their substantial accuracy. The figures given by the German consul are accordingly taken as representing fine kilograms. This gives for 1898 a silver product of 10,997,705 ounces fine, of a United States coining value of \$14,219,255, and for 1899 a silver product of 310,500 kilograms, or 9,980,731 ounces fine, of a United States coining value of \$12,904,380.

The figures for 1899 are repeated for 1900.

The following is condensed from the report of the German imperial consul at Cochabamba:

GOLD.

Gold is found in many provinces of Bolivia. Most of the gold mines and washings are now abandoned, for want of labor and requisite capital, but in former times they brought considerable wealth. The gold production is given, from official sources, in the following table:

Year.	Weight.	Year.	Weight.
	Kilograms.		Kilograms.
1895	450	1898.....	550
1896	500	1899.....	546
1897	685		

The kilogram is valued at 500 bolivars; its fineness is about 22 carats, and after smelting reaches 23 $\frac{1}{2}$ carats. The yield per ton is from 30 to 150 grams.

SILVER.

The production for the last five years was as follows:

Year.	Weight.	Year.	Weight.
	<i>Kilograms.</i>		<i>Kilograms.</i>
1895	669,000	1898.....	342,138
1896	655,000	1899.....	310,500
1897	682,228		

BRAZIL.

United States Minister Bryan reports to this Bureau that the product of gold in Brazil for 1900 was 5,011 kilograms, fine. This would give a United States value of \$3,330,311, equivalent to 161,104 ounces, fine.

MINING.

[From United States of Brazil, a geographical sketch compiled by the Bureau of the American Republics.]

Brazil in the last century was very properly considered a land of gold and diamonds. Gold, specimens of which were found by the Paulists as early as the first half of the sixteenth century (1540), exists in almost every State of the Republic, while diamonds of the finest water were sold in Europe as diamonds from India, after having been cut in Amsterdam. The real discovery of gold mines was effected by a party of Paulists in the territory of what is now known as the State of Minas Geraes in 1694. From that year to the end of the eighteenth century Brazil had no rival in mining wealth. It has been estimated (Le Bresil, Levasseur et Rio Branco, p. 67) that the gold produced by the mines of Brazil from the time of their discovery to 1820 amounted to 960,000 kilograms, worth at least 3,000,000,000 francs (about \$600,000,000). One-half of this amount was yielded by the mines of Minas Geraes, one-seventh by Goyaz, and the rest by São Paulo and Matto Grosso. Vernhagen, the author of the standard history of Brazil, states that the gold exported during the eighteenth century, exclusive of what was smuggled, was worth over \$300,000,000, while the exports of diamonds during the same period, exclusive of smuggling, weighed 2 quintals (200 pounds).

Gold and diamonds were then found on or very near the surface of the ground. The miners never dug deep pits. At the beginning of the nineteenth century these superficial deposits were practically exhausted. At the same time the more attractive industry of coffee, rubber, etc., led to the great neglect in the extraction of gold and precious stones. So the average yield from 1851 to 1870 for exportation was about \$1,400,000, and from 1881 to 1885, \$600,000.

The State of Minas Geraes (all kinds of mines) owes its name to the mineral wealth of its soil and to the importance of the mining resources contained within its limits. Among these, as already stated, gold occupies the first rank, mines of this metal formerly constituting the principal wealth of the State.

About the middle of the eighteenth century, in the year 1750, the greatest gold-mining movement took place in this province, when Ouro Preto was called Villa Rica, and contained more than 80,000 inhabitants. Since then the development of the gold mines has diminished, other branches of activity and industry claiming the attention of capitalists, fortune seekers, and speculators.

According to statistics (Recueil Consulaire de Belgique, vol. 104, 1899, p. 320), the gold production of the principal large mining companies, either in operation or which have been operated in Minas Geraes, is as follows:

	Kilograms.
"Gongo Soco" mine and others of the English company, "Imperial Brazilian Mining Association" (1824-1856)	13, 200
"Morro Velho" mine of the English company, "The St. John del Ray Mining Company, Limited" (1830-1898).....	65, 000
"Catta Branca" mine of the English company, "The Brazilian Company" (1832-1844).....	1, 181

	Kilograms.
"Morro de Santa Anna" mine of the English company, "The Don Pedro Gold Mining Company, Limited" (1862-1878).....	3, 000
"Pary" mine of the English company, "The Santa Barbara Gold Mining Company, Limited" (1862-1896).....	3, 000
"Passagem" and "Raposos" mines of the English company, "The Ouro Preto Gold Mines of Brazil, Limited"	4, 000

To the preceding list other mines and mining enterprises having a production of about 1,000 kilograms each must be added. Gold extracted by private parties, especially during the last century, rose to a much higher figure, which it would now be difficult to estimate.

As an illustration of the prospects of the mining industry in Brazil by modern methods, attention may be called to the São João del Rey Mining Company, an English concession, operating since 1834, but only lately equipped with modern appliances. It is stated in the last report of this company, for the month of October, 1900, that from 9,700 to 10,000 tons of quartz are crushed per month, or 120,000 tons per year, and that it is expected that very soon the proposed installation of the new power will enable 150,000 tons or more to be worked per year. The yield per ton for the month was 7,448 octaves, or 25 grams. The total yield for the month was 72,250 octaves of gold, worth £27,762 (\$138,810). In the following month the production amounted to \$36,000 from the 1st to the 10th and \$37,085 from the 11th to the 20th. This is equivalent to \$5,000 per day, or \$1,800,000 per annum. The miners work day and night, only stopping on St. John's day. The expense per ton, inclusive of taxes, fiscalization, etc., is about \$3 at the present rate of exchange. It is now ascertained that this mine is far from being the richest or the most easily worked of the many mines existing in Minas and other States. It is the opinion of many experts that in the near future, when the digging of deep shafts is more generally practiced, there will be discovered in Brazil mines resembling the Transvaal treasures. For a long time the gathering of gold and diamonds from the banks and beds of rivers has been the occupation of thousands of people, this being their only mode of earning a living in some districts of the States of Minas, Goyaz, and Matto Grosso.

Following are some of the mining items which were elaborated upon in the Monthly Bulletin of the Bureau of the American Republics for January, 1901 :

During the year 1900 gold mines at Juez de Fôre, of which the percentage of pure gold ranges from 50 to 100 grams per ton of ore ; preliminary examinations of gold mines (some of which are now being worked) at Caethe, Santa Barbara, Ouro Preto, Antonio Pereira, Santa Ana, and Subara ; the Tassara gold mines of Ouro Preto ; gold mines at Morro Velho, Passagen, São Bento, Juca, Veira, Santa Quiteria, Curão, and Honorio Biçaleo, all situated within a radius of 12 leagues and now employing 5,000 men.

The product is reported to be worth, on an average, 16,000,000 milreis.

BRITISH INDIA.

The director-general of statistics of British India informs this Bureau that the production of gold in British India from 1892 has been as follows:

Year.	Weight (0.916 $\frac{2}{3}$ fine).	Fine weight.	Value.
	<i>Kilograms.</i>	<i>Kilograms.</i>	
1892.....	4, 993	4, 576. 916	\$3, 041, 818
1893.....	6, 262	5, 740. 166	3, 814, 914
1894.....	6, 371	5, 840. 083	3, 881, 319
1895.....	7, 643	7, 006. 083	4, 656, 243
1896.....	10, 063	9, 224. 416	6, 130, 547
1897.....	11, 896	10, 904. 666	7, 247, 241
1898.....	12, 773	11, 708. 583	7, 781, 524
1899.....	14, 213	13, 028. 583	8, 658, 796
1900.....	15, 488	14, 197. 333	9, 435, 548

No silver is produced in India.

The Kolar gold field, which furnishes substantially all of the gold product of British India, contains some of the richest mines in the

world. The dividends of the Mysore Company for the last two years past have been 140 per cent in 1899 and 135 per cent in 1900, on a paid-up capital of £250,000, and the Champion Reef Company has followed next with 125 per cent for the year ended September 30, 1899, and 130 per cent for the year ended September 30, 1900, on a paid-up capital of £220,000. (The Mining World and Engineering Record, Nov. 9, 1901, p. 702.)

The article on the Mysore mine, reproduced below, shows the average yield per ton since 1884 to have been 1 ounce 9 pennyweights 17 grains, including the product of tailings. The company commenced paying dividends in 1886, and has distributed in all an amount equal to 985 per cent on the capital invested, or an average of 52 per cent annually since organization, after returning the entire capital invested. If the amount distributed in dividends is deducted from the value of the product since 1884 and the balance is taken to represent the working costs—the average cost per ounce, 0.916 $\frac{2}{3}$ fine—since organization does not exceed £1 16s. 5d., leaving a balance for dividends amounting to £2 1s. 7d. per ounce, or 112.4 per cent on the working costs. The rate of dividends to working costs for 1900 was 114.1 per cent.

There is a fair outlook for a large reduction of the working costs as a result of improved methods. By substituting electricity for steam power and utilizing water power for generating electricity it is expected to reduce the cost per horsepower by fully one-half and to do away with the use of fuel at the mine. The saving on the fuel item alone means a reduction of from one-third to two-fifths of the total mining cost. Further particulars are given below:

INDIAN MINE EXPENSES.

[From The Statist, London, July 13, 1901.]

In Volume XXXIII, part 1, of the Memoirs of the Geological Survey of India, there is given a most interesting account of the working of Indian gold mines in the Kolar district. In several directions the remarks of Dr. Hatch are of very suggestive character, in particular his observations on the practicability of effecting considerable economies in working cost. Much in the direction of the suggestions is already being carried out. For instance, a defect in past years has been the fact that some big companies have had multiplicity of mills that necessitated multiplicity of generating power. Centralization is being, or has been, effected by some of the companies, especially the Mysore, Champion Reef, and Ooregum. In regard to cost of power, the outlook is for a great reduction to be effected within a little time, as a big scheme is being carried out for generating electricity by means of water power. At present steam power is reckoned to cost an average of £31 per horsepower per annum. By utilizing the falls of the Cauvery River, 95 miles distant from Kolar, and transmitting the power by cable, it is estimated that the working cost per horsepower per annum will, when the scheme is effected, gradually come down to about £10. There will be the economy of reduced amount of labor and of practical extinction at the mine of the use of fuel and the cost of transit. Electric power will be most advantageous. At present the fuel item alone represents between 33 and 40 per cent of the total mining cost. Dr. Hatch sets out that a great deal more might be done than already has been arranged in regard to the use of labor-saving appliances, such as self-dumping skips, transport by endless-rope haulage, sorting belts and tables, in common use in South Africa and the United States, though not so much as they should be employed at Kolar, for the reason that in India native labor is so cheap. Having regard to "sorting" out of waste rock on the Kolar field, there would appear to be practically no labor-saving appliances, and the percentage of waste rock sorted out from the ore and rock raised to the service might with advantage be increased, it ranging about 7 to 10 per cent only. The amount of handling the tailings undergo from the time they leave the mill to the deposition on the residue heaps is commented upon, e. g.: As soon as the pits are full they are emptied by coolies, who scrape the wet sand up into baskets, which they carry on their heads to the heaps. On the Randt, by

means of a tailings wheel, or some form of sand pump, tailings from the plates are elevated, so that their deposition in vats and otherwise is almost automatic, and the wastes are removed with a minimum of handling.

ELECTRICAL POWER SCHEME.

[From The Mining World and Engineering Record, London, March 9, 1901.]

It is more than a year ago since we first drew attention to a proposal to "harness" the well-known Cauvery Falls and supply the mines on the Kolar gold field with electrical power. At that time considerable doubt was felt as to the practicability of the scheme, owing to the large amount of power required and to the fact that this power would have to be transmitted a distance of something like 90 miles.

Electrical power has for some years past been generated at the Niagara Falls and successfully distributed over an area not exceeding 2 miles, and it is now contemplated to extend the distance to several hundred miles; and in Germany 300 horsepower has been transmitted from Lauffen to Frankfort, a distance of 106 miles. Moreover, Professor Forbes, the eminent electrical expert, in a report on the power of the Periyar Lake in the Madras Presidency, has expressed the opinion that it would be quite possible to transmit that power for 350 miles to Madras. It was, however, with Capt. A. J. De Lotbiniere, R. E., deputy chief engineer of Mysore, that the idea originated of providing the gold mines at Kolar with electrical power to work their massive machinery, and he has during the last two years labored indefatigably to prove the feasibility of his project and, what is more important, the economic advantages of electricity over steam power. The height of the Cauvery Falls is 320 feet, but for something like a mile above them the river flows over a succession of rapids and minor falls, dropping about 100 feet in that distance. The power is described as enormous—far more, in fact, than is required by the mining industry—and should the present scheme prove successful it is intended to furnish the cotton mills of Bangalore with electrical power from the same source.

To the credit of the Mysore government be it said that as soon as they were convinced of the practical nature of Captain de Lotbiniere's proposal they at once gave it their hearty support; and, acting under the advice of Messrs. John Taylor & Sons the respective boards of the mining companies also accepted in a business like way the terms proposed by the government for the supply of the necessary power. The agreement is for a period of ten years, and is made between the Mysore government on the one hand and Messrs. John Taylor & Sons on the other hand. By it the Mysore government undertakes to "provide and install, in addition to the plant necessary for generating, transmitting, and transforming the electrical power, all conductors, motors, electrically driven air compressors, and other apparatus and buildings necessary for distributing and utilizing such power." The main features of the agreement (the Madras Weekly Mail states) are that the mines will take a minimum of 4,000 horsepower, and any further increase not less than 2,000 horsepower or more than 4,000 horsepower. The payments are to be as follows: During the first year from the commencement of supply, £29 per horsepower per annum; during the second, third, and fourth years, £18 per horsepower per annum; during the fifth year "such sum, not exceeding £24 per horsepower per annum, as the government may determine;" and during the remaining five years £10 per horsepower per annum. It may be stated here that the cost of working the machinery at the mines by steam power is about £30 per horsepower per annum, so that an annual supply of 4,000 horsepower would amount to £120,000. Similar power supplied by electricity on the basis of the agreement just alluded to would cost £628,000 in the ten years, or an average of £62,800 per annum. From these figures it would seem as if the saving to the companies will be equal to £57,200 a year. It is left to Messrs. John Taylor & Sons to decide as to the allotment of the power to each of the mines on the field.

THE MYSORE MINE.

[From the Mining World and Engineering Record, London, March 9, 1901.]

The progress of time will be realized by many of our readers when they understand that the present is the twenty-first annual report the existing Mysore company has issued.

We are told that the actual grade of the quartz has been some pennyweights lower. That is due to the treatment of a far larger quantity of lower grade ore than would have been dealt with in former years, owing to improvements in the machinery.

As indicating the extent of the company's operations it may be mentioned that 5,297 persons are employed on the mine.

In regard to the output of gold, it has been 163,133 ounces, to which the cyanide works contributed 19,024. The gold sold for £633,277, and the profit on the year's working was £401,746. The actual amount at the disposal of the directors was £403,774, out of which they have paid £200,000 in dividends, £19,000 income tax; written off to depreciation and sinking fund £35,247; contributed to the Indian famine fund £500; and with other amounts reached a total of £264,111. Out of the balance a final dividend of 5s. 6d. per share was declared, payable to-day, absorbing £137,500, leaving £2,162 to be carried forward. The actual dividend for the year was 135 per cent, as compared with 140 per cent the previous year. A very useful table of comparison is given, showing the results of 1899 as compared with 1900. The gold produced was 155,786 ounces in 1899, as compared with 163,133 ounces in 1900, and the sales realized £606,947 in 1899, as compared with £633,277 in 1900.

The usual statistical tables are given at the end of the report, and from these we find that from 1884 804,755 tons of quartz and 696,183 tons of tailings have been treated for a production of 1,195,469 ounces, which realized £4,665,113. The shareholders have received in dividends £2,486,905. During the year 30,000 new shares of 10s. each were issued at a premium of £4 10s. per share, for the purpose of enormously increasing the machinery and plant.

BRITISH NORTH AMERICA.

The value of the production for 1900 is officially stated at \$27,880,518, which represents 1,348,720 ounces, or 41,951 kilograms fine. All this quantity is won in Canada. There is no information available for the production of the precious metals in Newfoundland. Estimates of the production of gold at Swansea, Wales, from Newfoundland ores have appeared in the Mineral Industry every year since 1896. An examination of the British import statistics does not, however, confirm these estimates.

The progress of gold mining in Canada in 1900, since the discovery of gold in the Yukon, is shown in the following table:

Year.	Value of annual product.	Increase over the preceding year.	
		Value.	Per cent.
1897.....	\$6,027,016		
1898.....	13,775,420	\$7,748,404	128
1899.....	21,260,437	7,485,017	54
1900.....	27,880,518	6,620,081	31

There was added every year about \$7,000,000 to the value of the annual product. As most of it came from the Yukon district, where the production was partly estimated and given only in millions of dollars, variations below \$1,000,000 may be disregarded. The relative rate of increase must naturally have fallen off with the growth of the annual production. This increase is entirely due to Yukon and British Columbia, whose aggregate product amounted to 96.8 per cent of the entire product for Canada. The production in Nova Scotia and Ontario decreased during the year.

The silver production of 1900 was 4,448,755 ounces, or 138,400 kilograms fine, of a United States coining value of \$5,751,926, which shows a marked progress over 1899 and brings it back to the level of 1898. Of this quantity 88.5 per cent was won in British Columbia, to which practically all the increase was due.

The information given here was compiled from Canadian official publications and brought up to date from information furnished by

Mr. Abraham E. Smith, United States consul at Victoria, British Columbia, as well as by direct correspondence with the geological survey of Canada.

According to information furnished to this Bureau by the geological survey department of Canada, under date of Ottawa, May 23, 1898, an ounce of fine gold was taken, for statistical purposes, at \$20.67. The rate adopted for the value of the fine gold product in the tables of this Bureau is \$20.671834625+. This accounts for the slight deviation in the total value of the gold product of Canada, in the table of the world's production, from the figures reproduced here from Canadian sources.

The commercial value of an ounce of fine silver for 1900 has been accepted at \$0.62, which likewise explains the difference between the total value of the silver product of Canada, given above, and that appearing in the table of the world's production.

GEOLOGICAL SURVEY OF CANADA,
Ottawa, April 23, 1901.

DEAR SIR: Your letter to the late Dr. G. M. Dawson, dated January 19 last, has lain over in order that we might obtain the information you desired, which I have now the pleasure of sending you on a separate memorandum.

Yours, truly,

ROBERT BELL, *Acting Director.*

HON. GEORGE E. ROBERTS,
Director of the Mint, Treasury Department,
Washington, D. C., U. S. A.

PRODUCTION OF GOLD AND SILVER IN CANADA, 1900, BY PROVINCES.

Province.	Gold.	Silver.	
	Value.	Ounces.	Commercial value.
Nova Scotia.....	\$570, 918		
Quebec.....		58, 400	\$35, 863
Ontario.....	297, 495	161, 650	99, 269
Saskatchewan River.....	5, 000		
Yukon district.....	22, 275, 000	290, 000	178, 089
British Columbia.....	4, 732, 105	3, 938, 705	2, 418, 759
Total	27, 880, 518	4, 448, 755	2, 731, 980

ELFRIC DREW INGALL.

To the Director U. S. Mint, GEORGE E. ROBERTS.
OTTAWA, April 23, 1901.

The latest annual report of the section of mineral statistics and mines, geological survey of Canada, contains corrected figures of the production and exports of gold and silver in Canada, brought down to 1899.

The exports for 1899, according to the information obtained from the books of the customs department, were as follows:

Gold	\$6, 437, 029
Silver	1, 623, 905

Neither gold nor silver was imported.

GOLD.

Owing largely to the continued productiveness of the Yukon placer deposits, the yield of gold in Canada in 1899 reached a total value of \$21,261,584, a value which the yearly total mineral production of Canada previous to 1895 had not attained.

In 1898 the output was \$13,775,420, so that the increase in 1899

amounted to \$7,486,164, or 54 per cent. The increase of 1898 over 1897 was 128 per cent, and of 1897 over 1896, 118 per cent.

As has been said, much of these large increases is due to the placer workings on the rivers of the Yukon district; nevertheless, while attention is thus drawn to our present chief source of supply due credit must at the same time be given to our other gold areas whose output has been steadily increasing. Excluding the product of the Yukon, the increase in the output of the other gold fields in 1899 over 1898 amounted to 39.3 per cent, the increase of 1898 over 1897 being 7 per cent, and of 1897 over 1896, 43.6 per cent.

The proportions contributed by the various provinces to the total in 1899 were approximately as follows: Yukon district, 75 per cent; British Columbia, nearly 20 per cent; Nova Scotia, about 3 per cent, and Ontario, about 2 per cent. Seventeen million three hundred and sixty-four thousand eight hundred and sixteen dollars, or nearly 82 per cent of the total, was derived from placer workings, and \$3,896,768, or 18 per cent, from milling and smelting ores.

Increases in production are shown in all the important gold-producing provinces, viz: Nova Scotia, Ontario, British Columbia, and the Yukon district; those in which decreases are shown—Quebec and the Saskatchewan River—having but a small output compared with the others.

ANNUAL PRODUCTION OF GOLD IN CANADA.

Calendar year.	Fine ounces.	Value.
1887	57,465	\$1,187,804
1888	53,150	1,098,610
1889	62,658	1,295,159
1890	55,625	1,149,776
1891	45,022	930,614
1892	43,909	907,601
1893	47,247	976,603
1894	54,605	1,128,688
1895	100,806	2,083,674
1896	133,274	2,754,774
1897	291,582	6,027,016
1898	666,445	13,775,420
1899	1,028,620	21,261,584
1900	1,348,720	27,880,518

(Calculated from the values at the rate of \$20.67 per ounce.)

NOVA SCOTIA.

GOLD.

The production in 1899, \$617,604, is the highest recorded and is greater than that of the previous year by \$79,014, or nearly 15 per cent. The quantity of quartz crushed increased in even greater proportion than the output of gold, so that the average yield per ton was only \$5.50 as compared with \$6.50 in 1898. An examination of Table 4 will show that from 1863 to 1892 the average yield per ton varied from \$22 to \$11, while since 1892 the yield has averaged less than \$8 per ton.

The highest average yield per ton from districts producing over 1,000 ounces was from Wine Harbor, the return there being 18 pennyweight 12 grains, or \$18.03, and the least was from Salmon River, with an average of 1 pennyweight 18 grains, or \$1.71 per ton. The greatest yield of any district was obtained from Renfrew, with a return of 3 ounces 16 pennyweight 21 grains, or \$74.95 per ton. The average yield for the province was 5 pennyweight 15 grains, or \$5.50.

ANNUAL PRODUCTION, GOLD.

Calendar year.	Value.	Calendar year.	Value.
1862.....	\$141,871	1882.....	\$275,090
1863.....	272,448	1883.....	301,207
1864.....	390,349	1884.....	313,554
1865.....	496,357	1885.....	432,971
1866.....	491,491	1886.....	455,564
1867.....	532,563	1887.....	413,631
1868.....	400,555	1888.....	436,939
1869.....	348,427	1889.....	510,029
1870.....	387,392	1890.....	474,990
1871.....	374,972	1891.....	451,503
1872.....	255,349	1892.....	389,965
1873.....	231,122	1893.....	381,095
1874.....	178,244	1894.....	389,338
1875.....	218,629	1895.....	453,119
1876.....	233,585	1896.....	493,568
1877.....	329,205	1897.....	562,165
1878.....	245,253	1898.....	538,590
1879.....	268,328	1899.....	617,604
1880.....	257,823	1900.....	570,918
1881.....	209,755		

ORE TREATED AND YIELD OF GOLD PER TON.

Calendar year.	Tons treated.	Yield of gold per ton.	Calendar year.	Tons treated.	Yield of gold per ton.
1862.....	6,473	\$21.91	1881.....	16,556	\$12.66
1863.....	17,000	16.02	1882.....	21,081	13.04
1864.....	21,431	18.21	1883.....	25,954	11.60
1865.....	24,421	20.32	1884.....	25,186	12.44
1866.....	32,157	15.28	1885.....	28,890	14.98
1867.....	31,384	16.96	1886.....	29,010	15.70
1868.....	32,259	12.41	1887.....	32,280	12.81
1869.....	35,144	19.91	1888.....	36,178	12.08
1870.....	30,824	12.56	1889.....	39,160	13.02
1871.....	30,787	12.17	1890.....	42,749	11.11
1872.....	17,089	14.94	1891.....	36,351	12.42
1873.....	17,708	13.05	1892.....	32,552	11.98
1874.....	13,844	12.87	1893.....	42,354	8.99
1875.....	14,810	14.76	1894.....	55,357	7.04
1876.....	15,490	15.08	1895.....	60,600	7.47
1877.....	17,369	18.95	1896.....	69,169	7.13
1878.....	17,989	13.63	1897.....	73,192	7.68
1879.....	15,936	16.83	1898.....	82,774	6.50
1880.....	13,997	18.42	1899.....	112,226	5.50

QUEBEC.

ANNUAL PRODUCTION, GOLD.

Calendar year.	Value.	Calendar year.	Value.
1877.....	\$12,057	1889.....	\$1,207
1878.....	17,937	1890.....	1,350
1879.....	23,972	1891.....	1,800
1880.....	33,174	1892.....	12,987
1881.....	56,661	1893.....	15,696
1882.....	17,093	1894.....	29,196
1883.....	17,787	1895.....	1,281
1884.....	8,720	1896.....	3,000
1885.....	2,120	1897.....	900
1886.....	3,981	1898.....	6,089
1887.....	1,604	1899.....	4,916
1888.....	3,740		

ONTARIO.

Most of the gold output from Ontario is derived from the free-milling ore of the western part of the Province, though the gold found in association with arsenical pyrites in Hastings County is worked to a considerable extent. The gold industry has been of comparatively

recent growth, amounting in 1891 to only \$2,000. The output for 1899 was \$421,591, as compared with \$265,889 in 1898, the increase being \$155,702, or 58 per cent.

From 65,403 tons of ore mined there were obtained 25,371 ounces of crude bullion of an average value per ounce of \$16.62. The value per ton of ore treated ranged from \$3.56 to \$11, and averaged \$6.45 for the total output.

ANNUAL PRODUCTION, GOLD.

Calendar year.	Fine ounces.	Value.
1887	327	\$6,760
1888		
1889		
1890		
1891	97	2,000
1892	344	7,118
1893	708	14,637
1894	1,917	39,624
1895	3,015	62,320
1896	5,563	115,000
1897	9,158	189,294
1898	12,864	265,889
1899	20,395	421,591

Calculated from the value at the rate of \$20.67 per ounce.

NORTHWEST TERRITORIES.

The gold fields of the Northwest Territories are confined to the alluvial workings of the Saskatchewan River, and those of the Yukon River and its tributaries. The difficulty of obtaining anything like accurate statistics of the output from such deposits as these, where thousands of men are independently engaged in mining the precious metal, will be easily recognized. Much of the Saskatchewan River gold finds its way to the local banks, and a basis for an estimation of the product is thus found, while the greater part of the Yukon gold is ultimately sold at the different receiving offices of the United States Mint. The receipts of these offices, taken in conjunction with careful estimates by government officers, bank managers, and transportation companies at Dawson, furnish a means of estimating the Yukon output probably as accurately as it is possible to obtain it.

Statistics of production in the two districts since 1887 are shown in the following table :

GOLD PRODUCTION.

Calendar year.	Yukon district.		Saskatchewan river.	
	Fine ounces.	Value.	Fine ounces.	Value.
1885	4,838	\$100,000		
1886				
1887	3,387	70,000	102	\$2,100
1888	1,935	40,000	58	1,200
1889	8,466	175,000	968	20,000
1890	8,466	175,000	194	4,000
1891	1,935	40,000	266	5,500
1892	4,233	87,500	508	10,506
1893	8,515	176,000	466	9,640
1894	6,047	125,000	725	15,000
1895	12,095	250,000	2,419	50,000
1896	14,514	300,000	2,661	55,000
1897	120,948	2,500,000	2,419	50,000
1898	483,793	10,000,000	1,209	25,000
1899	774,069	16,000,000	726	15,000
Total.....	1,453,241	30,038,500	12,721	262,946

Calculated from the value at the rate of \$20.67 per ounce.

The production of the Yukon district in 1899 is estimated at \$16,000,000, an increase over the previous year of \$6,000,000, or 60 per cent. The total output of this district to the end of 1899 has been over \$30,000,000.

The occurrence of gold and the geological features of the district are being examined by Mr. R. G. McConnell, of the Survey, and a full preliminary report of his investigations during the summer of 1899 will be found in the summary report for that year. (See Report on Production of Precious Metals, Bureau of the Mint, 1899.)

Mr. McConnell reports:

It is unlikely that the rapid increase in production of the last two years will be continued, as serious inroads have already been made on the rich portions of Eldorado and Bonanza creeks, and to a less extent on Hunker and Dominion creeks, but the amounts remaining, with the long stretches of medium and low grade gravels still untouched on all the creeks, insure a high production for a number of years.

The employment of machinery in the working of Klondike claims is gradually increasing, but is still insignificant, a fact due largely to the absence of roads and the consequent impossibility of transporting heavy pieces up the creeks. Steam thawers are largely used, and steam pumps are gradually replacing hand pumps, Chinese pumps, and water wheels for draining the pits. Steam hoists are employed at a few of the mines, but are not in general use.

The greater part of the work of the camp is still done by hand, and this notwithstanding the fact that, taking into consideration the high price of labor, nowhere in the world could machinery be more profitably employed.

BRITISH COLUMBIA.

The record production of gold in British Columbia, which was made in 1863 and amounted to \$3,913,563, has at last been exceeded. The output for 1899 was \$4,202,473, and was greater than the output for 1898 by nearly 43 per cent. The production of 1863, and for many years subsequently, was derived entirely from placer workings, whereas during the past year 32 per cent of the product was obtained from the placer and hydraulic workings and 68 per cent from lode mining.

The yield of placer gold was \$1,344,900, an amount not equaled within the past twelve years and over double the placer yield for 1898. This increase is due to the Atlin district in the northern part of the province, the output of which is reported as \$800,000. The output of the other placer districts has not changed much from the previous year.

PRODUCTION OF GOLD IN BRITISH COLUMBIA, 1890-1900.

Calendar year.	Value.	Calendar year.	Value.
1890	\$494,436	1896.....	\$1,788,206
1891	429,811	1897.....	2,724,657
1892	399,525	1898.....	2,939,852
1893	379,535	1899.....	4,202,473
1894	530,530	1900.....	4,732,105
1895	1,266,954		

AVERAGE NET SMELTER RETURNS, OR ACTUAL YIELD PER TON.

Year.	Gold.	Silver.	Copper.	Value.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Per cent.</i>	
1894	2	2.89	2.85	\$40.69
1895	1.60	2.41	2.10	35.67
1896	1.45	2.34	2.08	32.65
1897	1.42	1.60	1.32	30.48
1898	.78	1.54	2.35	22.10
1899	.596	1.07	1.65	18.70
Average, 412,375 tons	.916	1.47	1.85	23.81

SILVER.

The production of silver in Canada reached a maximum in 1897, when the output was 5,558,446 ounces, valued at \$3,323,395. The past two years have shown successive decreases, so that the output of 1899, which was 3,411,644 ounces, valued at \$2,032,658, or 59.58 cents per ounce, was less than the output of 1897 by over a million dollars.

The production of silver has increased very largely since 1894, due entirely to the output from British Columbia. The other provinces, Ontario and Quebec, were, previous to 1894, the most important silver producers, British Columbia in these years occupying but a secondary position. Since 1894, however, production in the eastern provinces has greatly fallen away, ceasing altogether in Ontario in 1894, 1895, and 1896, while in Quebec the output is not much more than one-fourth of what it was ten years ago.

The silver production in British Columbia is chiefly from the silver-lead ores of the Slocan, the silver-copper ores of Nelson, the pyrrhotite and chalcopyrite ores of Rossland also contributing to the total output.

The production by districts in 1898 and 1899 was as follows:

District.	1898.	1899.
Kootenai East:	<i>Ounces.</i>	<i>Ounces.</i>
Fort Steele division	69,780	33,516
Other divisions		1,627
Kootenai West:		
Ainsworth division	167,147	268,165
Nelson division	692,367	483,659
Slocan division	3,068,648	1,891,025
Trail Creek division	170,804	185,818
Other divisions	121,510	48,463
Yale:		
Osoyoos division		2,719
Similkameen.....		16
Yale.....		47
Coast and other districts	2,145	24,358
Total	4,292,401	2,939,413

The most important change is the large decrease in the output of the Slocan. In this division in 1899, 21,507 tons of ore were mined as compared with 30,691 tons in 1898 and 33,567 tons in 1897. The labor troubles of 1899 doubtless had much to do with this decrease.

The following tables show the output and average yield per ton of the Slocan mines for the past five years:

NET PRODUCTION PER SMELTER RETURNS.

Year.	Ore.	Silver.	Lead.	Gold.	Value.
	<i>Tons.^a</i>	<i>Ounces.</i>	<i>Pounds.</i>	<i>Ounces.</i>	
1895.....	9,514	1,122,770	9,666,324	6	\$1,045,600
1896.....	16,560	1,954,258	18,175,074	152	1,854,011
1897.....	33,567	3,641,287	30,707,705	193	3,280,686
1898.....	30,691	3,068,648	27,063,595	60	2,619,852
1899.....	21,507	1,891,025	16,660,910	14	1,740,372
Total	111,839	11,677,988	102,273,608	425	10,540,521

^a 2,000 pounds.

ACTUAL YIELD PER TON.

Year.	Silver.	Lead.	Value.
	<i>Ounces.</i>	<i>Per cent.</i>	
1895.....	118	50.8	\$109.90
1896.....	118	54.9	111.95
1897.....	108.5	45.7	97.73
1898.....	100	44.1	85.36
1899.....	87.9	38.7	80.92
For 111,839 tons	104.4	45.7	94.25

The following table gives the exports of silver ores as entered in the customs returns. Attention should perhaps be drawn to the discrepancies between this table and the table of production, since it would appear to show that more silver has been exported than has been produced during the past four years. The figures of production for these years are known to be based upon smelter returns, and the quantities are valued at the average market value for the refined metal. They can, therefore, be assumed to be the more correct:

EXPORTS OF SILVER ORE.

Province.	Calendar year—						
	1893.	1894.	1895.	1896.	1897.	1898.	1899.
Ontario.....	\$7,878	.....	\$100	.....	\$5,885	\$40,298	\$61,948
Manitoba.....	820	.....	.....	.....	.....	.....	.....
Northwest Territories.....	.....	.....	.....	.....	.....	1,212	7,743
British Columbia.....	204,997	\$359,731	994,254	\$2,271,959	3,570,506	2,860,767	1,554,214
Total	213,695	359,731	994,354	2,271,959	3,576,391	2,902,277	1,623,905

SILVER, ANNUAL PRODUCTION.

Calendar year.	Ontario.		Quebee.		British Columbia.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	<i>Ounces.</i>		<i>Ounces.</i>		<i>Ounces.</i>	
1887.....	190,495	\$186,304	146,898	\$143,666	17,690	\$17,301
1888.....	208,064	195,580	149,388	140,425	79,780	74,993
1889.....	181,609	169,986	148,517	139,012	53,192	49,787
1890.....	158,715	166,016	171,545	179,436	70,427	73,666
1891.....	225,633	222,926	185,584	183,357	3,306	3,266
1892.....	41,581	36,425	191,910	168,113	77,160	67,592
1893.....	.....	8,689	.....	126,439	.....	195,000
1894.....	.....	.....	101,318	63,830	746,379	470,219
1895.....	.....	.....	81,753	53,369	1,496,522	976,930
1896.....	.....	.....	70,000	46,942	3,135,343	2,102,561
1897.....	5,000	2,990	80,475	48,116	5,472,971	3,272,289
1898.....	85,000	49,521	74,932	43,655	4,292,401	2,500,753
1899.....	202,000	120,352	40,231	23,970	2,939,413	1,751,302
1900.....	161,650	99,269	58,400	35,863	3,938,705	2,418,759

Calendar year.	Yukon.		Total.	
	Quantity.	Value.	Quantity.	Value.
	<i>Ounces.</i>		<i>Ounces.</i>	
1887.....			355,083	\$347,271
1888.....			437,232	410,998
1889.....			383,318	358,785
1890.....			400,687	419,118
1891.....			414,523	409,549
1892.....			310,651	272,130
1893.....				330,128
1894.....			847,697	534,049
1895.....			1,578,275	1,030,299
1896.....			3,205,343	2,149,503
1897.....			5,558,446	3,323,395
1898.....			4,452,333	2,593,929
1899.....	230,000	\$137,034	3,411,644	2,032,658
1900.....	290,000	178,089	4,448,755	2,731,980

CONSULATE OF THE UNITED STATES,
Victoria, May 29, 1901.

SIR: I have the honor to inclose the following statistics in regard to the mines of British Columbia, condensed from the official report of the minister of mines, just published:

British Columbia has produced up to date \$62,584,442 of placer gold, \$12,812,860 of lode gold, \$12,638,449 of silver, \$7,619,626 of lead, and \$4,362,583 of copper. Total mineral production for 1900, \$11,348,481. The minister observes that the population of the Province is estimated at 160,000, and this makes an average of about \$70.93 to every inhabitant.

The gold production of the Province for the year 1900, including both placer and lode gold, was worth \$4,732,105, an increase over 1899 of \$529,632. The total amount of silver produced the past year was 3,958,175 ounces, worth \$2,309,200, an increase in value over 1899 of \$645,492, or an equivalent of 39 per cent. The output of lead for 1900 amounts to 63,358,621 pounds, valued at \$2,691,887. This is an increase over the previous year of \$1,813,017, equivalent to 206 per cent. The fine copper produced in 1900 was 9,977,080 pounds, worth \$1,615,289, an increase in pounds worth \$1,351,453, an increase in value of 19.5 per cent over the previous year.

The current wages per day in and about the mines are as follows: Miners, \$3 to \$3.50; helpers, \$2 to \$2.50; laborers, \$2 to \$2.50; blacksmiths and mechanics, \$3 to \$5.

I have the honor to be, sir, your obedient servant,

ABRAHAM E. SMITH,
United States Consul.

HON. THOMAS W. CRIDLER,
Assistant Secretary of State, Washington, D. C.

MINERAL PRODUCTION OF BRITISH COLUMBIA.

[From the Annual Report of the Minister of Mines for the year ending December 31, 1900.]

METHOD OF COMPUTING PRODUCTION.

In assembling the output of the lode mines in the following tables, the established custom of this department has been adhered to, viz, the output of a mine for the year is considered that amount of ore for which the smelter or mill returns have been received during the year. This system does not give the exact output of the mine for the year, but rather the amounts credited to the mine on the company's books during such year.

For ore shipped in December the smelter returns are not likely to be received until February of the new year or later, and have, consequently, to be carried over to the credit of such new year. This plan, however, will be found very approximate for each year and ultimately correct, as ore not credited to one year is included in the next.

In the lode-mines table the amount of the shipments has been obtained from certified returns received from the various mines, as provided for in the "inspection of metalliferous mines act, 1897." In calculating the values of the products the average price for the year in the New York metal market has been used as a basis. For silver 95 per cent and for lead 90 per cent of such market price have been taken. Treatment and other charges have not been deducted.

TOTAL PRODUCTION FOR ALL YEARS UP TO AND INCLUDING 1900.

Gold, placer	\$62,584,443
Gold, lode	12,812,860
Silver	13,649,809

AMOUNT AND VALUE OF GOLD AND SILVER PRODUCT FOR 1898, 1899, AND 1900.

Metals.	1898.		1899.		1900.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	<i>Ounces.</i>		<i>Ounces.</i>		<i>Ounces.</i>	
Gold, placer.....	32,167	\$643,346	67,245	\$1,344,900	63,936	\$1,278,724
Gold, lode.....	110,061	2,201,217	138,315	2,857,573	167,153	3,453,381
Silver	4,292,401	2,375,841	2,939,413	1,663,708	3,958,175	2,309,200
Total.....	4,434,629	5,220,404	3,144,973	5,866,181	4,189,264	7,041,305

Calculated out into percentages, the following is what this table shows:
Placer gold in 1900 shows 5 per cent decrease from 1899 and 99 per cent increase over 1898.
Lode gold in 1900 shows 21 per cent increase over 1899 and 57 per cent increase over 1898.
Combined gold in 1900 shows 12½ per cent increase over 1899 and 66 per cent increase over 1898.
Silver in 1900 shows 39 per cent increase over 1899 and 3 per cent decrease from 1898.

PLACER GOLD.

The following table contains the yearly production of placer gold to date, as determined by the returns sent in by the banks and express companies of gold transmitted by them to the mints, and from returns sent in by the gold commissioners and mining recorders. To these yearly amounts one-third was added up to the year 1878; from then to 1895 and for 1898 and 1899, one-fifth, which proportions are considered to represent approximately the amount of gold sold of which there is no record. This placer gold contains from 10 to 25 per cent silver, but the silver value has not been separated from the totals, as it would be insignificant.

YIELD OF PLACER GOLD PER YEAR TO DATE.

1858	\$705,000	1881	\$1,046,737
1859	1,615,070	1882	954,085
1860	2,228,543	1883	794,252
1861	2,666,118	1884	736,165
1862	2,656,903	1885	713,738
1863	3,913,563	1886	903,651
1864	3,735,850	1887	693,709
1865	3,491,205	1888	616,731
1866	2,662,106	1889	588,923
1867	2,480,868	1890	490,435
1868	3,372,972	1891	429,811
1869	1,774,978	1892	399,526
1870	1,336,956	1893	356,131
1871	1,799,440	1894	405,516
1872	1,610,972	1895	481,683
1873	1,305,749	1896	544,026
1874	1,844,618	1897	513,520
1875	2,474,004	1898	643,346
1876	1,786,648	1899	1,344,900
1877	1,608,182	1900	1,278,724
1878	1,275,204		
1879	1,290,058		
1880	1,013,827		
		Total	62,584,443

PRODUCTION OF LODE MINES.

The information as to production in the earlier years is obtained from the Mineral Statistics and Mines for 1896, geological survey of Canada:

Years.	Gold.		Silver.	
	Ounces.	Value.	Ounces.	Value.
1887			17,690	\$17,331
1888			79,780	75,000
1889			53,192	47,873
1890			70,427	73,948
1891			4,500	4,000
1892			77,160	66,935
1893	1,170	\$23,404	227,000	195,000
1894	6,252	125,014	746,379	470,219
1895	39,264	785,271	1,496,522	977,229
1896	62,259	1,244,180	3,135,343	2,100,689
1897	106,141	2,122,820	5,472,971	3,272,836
1898	110,061	2,201,217	4,292,401	2,375,841
1899	138,315	2,857,573	2,939,413	1,663,708
1900	167,153	3,453,381	3,958,175	2,309,200
Total	630,615	12,812,860	22,570,953	13,649,809

CONCERNING PROSPECTS.

While production must be the ultimate measure of our success as a mining community, yet but a small portion of the energy of the country is employed in a class of mining which is at the present time productive. Every accessible section of the Province is being "prospected" more or less thoroughly, and many sections are being developed with good promises of success, while still others which are known to contain valuable mineral must necessarily lie dormant until the growth of the country provides sufficiently good transportation facilities to enable them to be opened up.

Prospects are "promises," and the degree of faith placed in their fulfillment will be measured by the manner in which our mines—the prospects of a few years ago—are now fulfilling the promises then given.

The statistics show that these mines have, during the past year (1900), paid back principal and interest to the lenders of the money for their development.

This total amount so returned was, in 1898, \$6,529,420; in 1899, \$6,751,604, and in 1900 reached the sum of \$10,069,757, an increase of 49 per cent over 1899 and 54 per cent over 1898.

Prospects may be said to borrow money on promissory notes, and, unfortunately, many "promising prospects" have failed to meet their obligations, with the result that the capitalist can only be induced to advance money by the expectation of a high premium and a large rate of interest on the loan.

In consideration of such high premium and rate of interest, the lender must necessarily expect to make losses in individual cases, but if, in a series of transactions, the principal and a fair rate of interest is returned, then this form of investment must be considered a profitable one, and that it is so profitable is found by those who investigate the matter.

These "notes" of the prospects have, however, to pass through the hands of promoters who, too often, not content with a regular commission, raise the "notes" or add on such a premium that but a small percentage of the original loan is available for the development of the prospect.

A prospect which gets, say, \$10,000 might pay back such loan doubled or trebled, but why should it be saddled with a debt of \$1,000,000 and expected to pay this back with interest? Is it any wonder that a prospect like this becomes a failure?

Why should mining investment not be entered into as would any commercial business, only after serious investigation?

If the investing public—the real lenders of money to the prospects—would exercise ordinary business caution and see to it that the money for the stock they buy is used as it should be, on work and not to fatten the promoter, there would be more successful working mines in the Province to-day.

THE KLONDIKE FIELD.

[From the Economist, London, November 2, 1901, pp. 1612-1613.]

There are two tributaries of the Yukon, which fall into the larger river 20 miles apart—the Klondike and the Indian by name. Between these there is a high ridge of country, and from either side of this ridge flow numerous creeks into these small rivers. Such is the topographical feature of the country for 40 miles back from the Yukon.

This district, then, 20 miles wide, 40 long, and bounded on three sides by the rivers named, is called "The Klondike," and to this area is confined the population and the activity.

The country rock of the Klondike is a coarse-grained siliceous schist. Lying on this in the creek beds and on "benches" on the hillsides above the creeks is a layer of white quartz gravel, which contains the alluvial gold. This "gravel" is made up of pieces of waterworn quartz, varying in size from a pin's head to a ton or so in weight, and perhaps one-half of the total bulk consists of stones weighing several pounds. The layers of gravel found lying on the benches on the hillside, perhaps 200 or 300 feet above the present beds of the creeks, may represent the original level of the creeks at the time the gravel was brought there. In this case the creek gravels have sunk with the bed of the creek, and might be expected to be more concentrated and therefore richer than the gravel on the benches.

Some geologists consider that the creek and bench gravels are due to different origins. They also differ as to the origin of the gold, and in only one essential—that is to say, in all differing from each other—are they unanimous about any geological fact or theory connected with this field.

But one thing is certain: The gold was there all right, both in the creeks and in the bench gravels, and £13,000,000 have already been taken out.

Klondike is much the richest alluvial field discovered since the early days of California and Victoria, but is handicapped by the exceptional cost of treatment. A lot of people would have one believe that the present finds of alluvial gold are as nothing compared to the great quartz reefs which are to be discovered before long. On the mind of the layman they leave the impression that somewhere near Klondike is an immense mother lode, only half disintegrated, which half has furnished the alluvial gold already found, rotten with visible gold, and certain to be the greatest mineral deposit ever found since the world began. This is, of course, all rubbish. The gold found in the creeks, being not greatly waterworn, no doubt at one time existed in small rich quartz veins, probably in hills close to its present position, which would have long since eroded, but there is no reason to think that below or in the present country rock of schist any more such veins will be found. I inspected one or two of the so-called quartz mines, which were being opened by small winzes, and would not have accepted as a gift the properties which they are located on. A year ago there was great talk of a blanket formation, too, found about 30 miles from Dawson. It was even rumored that this was the mother lode at last. But a friend of mine who sampled it could hardly get even traces out of it, so the quest for the mother lode has again been transferred elsewhere.

Turning, then, our attention exclusively to the alluvial gravels, let me try to explain the richness of these and the excessive cost of treating them. There are about 70 miles of creek beds carrying gravel. The width varies from 20 to 30 feet near the source of the creek to perhaps 1,000 feet where the creek enters the river. The depth of gravel varies, but will average probably 10 or 12 feet. As can be easily imagined, the gold, which is in coarse flakes or in small nuggets, has mostly sunk to the bottom of the gravel, and probably nine-tenths of it is found in the lower inch or two, or even down in among the cracks in the half decomposed bedrock. It is thus necessary to handle about 12 feet deep of gravel, plus a layer of black vegetable mold, which lies on the top of it, and to dig down several feet into the decomposed bedrock in order to expose the gold. If all this material could be broken down by a big stream of water, played through a nozzle, and if it could then be swept away through a sluice box, leaving the gold lying in the bottom of the box, the expense of treatment would be nothing to speak of. But at the Klondike there is not enough water for this purpose, and not enough grade to carry the material away; it has all to be broken by pick and shovel, reshoveled into a sluice box, which too often has not enough water in it for proper work, and this by laborers who cost the employer on an average 27s. 6d. per man a day. The gravels on the benches are still more expensive to handle. A small stream of water for sluicing has to be pumped up out of the creek, and the wood fuel that is used for this costs equal to £7 a ton for coal. The same labor is needed for breaking down the gravel, and there is an extra cost in building barricades to prevent the tailings running down into the creeks.

Labor is, of course, much the heaviest item in the bill. A laborer receives £1 a day and his food, which probably costs 7s. 6d. a day. He can not be reduced under present conditions. To get to Klondike from the States or Canada costs him £20; he finds a working season of only one hundred and twenty days in the year; and unless he is lucky enough to get work in the winter at woodcutting or in one of the claims where they do underground work by thawing the gravel, he will have to return to the south or exhaust his savings while staying idle.

Fuel for feeding boilers costs nearly £3 a cord. To land machinery or supplies by the White Pass and Yukon route costs £25 per ton for freight alone, and all miscellaneous items are in proportion.

No ordinary alluvial ground could stand this expense, or even half of it. But the Klondike reefs are exceptionally rich, and there are many claims, especially on Eldorado and Bonanza creeks, where the expenses did not amount to nearly as much as the gold produced.

Of course alluvial gold is always irregular in its occurrence. Thus, some of the creeks are rich nearly all the way down, but on others a really rich claim was the exception. The richest ground was worked first. Some of the best claims are now worked out, and it is safe to say that by the autumn of 1903 practically all the rich ground will be finished. Klondyke reached its zenith last year. In that season gold to the value of \$22,000,000 was put out; this year the yield dropped to about \$16,000,000, and from now onward there will be a sure decline.

But this does not mean the early extinction of the Klondyke field. As yet only the richest ground, a mere fraction of the total gravel area, has been worked. The

future, as in all gold fields, lies with the great bodies of low-grade material. This low-grade gravel at Klondyke would be rich anywhere else, but here conditions are such that costs can never be otherwise than high, and relatively the gravel becomes low grade. The serious problem for the future is the want of water. The big masses of low-grade gravel, both on the benches and in the creeks, must in future be treated on a big scale, and the only way to do that is by hydraulic sluicing. But there is no water for this. It will have to be pumped up hundreds of feet from the Klondyke River, and the cost of a plant, the consumption of fuel, and the wear and tear will mean a heavy and continued expense.

Who can undertake this? Not the individual claim owner now taking out the rich patches of his ground; not the small syndicate, which in the future will amalgamate a series of adjoining claims; not even a company run in the way that London-floated Klondyke companies have been run. It is a scheme more for the Government than for any individual.

The future of Klondyke means the handling of lower grade gravel than in the past, and militating chiefly against this is the lack of water. A good deal of the yet unworked ground can be worked by the open-cut system for four months in the year, but the old method of winter work—that is, sinking small shafts into the frozen gravel and throwing out the lower foot or two—must soon come to an end. The day of the individual is nearly over. Blocks of adjoining claims must be amalgamated and worked systematically, taking the whole of the ground as it comes. Hitherto the individual has picked the rich portions out of his claims, but in future a more moderate yield over a bigger quantity of material handled is all that can be expected.

NOVA SCOTIA.

According to the Report of the Department of Mines of Nova Scotia (pp. 74, 75, 85, 87) for the year ending September 30, 1900, the total yield of gold in that year was 30,400 ounces, and the total from 1862 to 1900, 717,881 ounces, which, valued at \$19 per ounce, was worth \$13,639,749.

The total exports of gold bullion and bars from Nova Scotia during the same period were as follows:

Port:	
Truro	\$13,055
Halifax	196,695
Windsor	3,210
Total	212,960

The value of the gold product of Nova Scotia for the same year, at the rate of \$19 per ounce, as above, amounted to \$577,600, which leaves an amount worth \$364,640 unaccounted for during that year.

Dr. Edwin Gilpin, jr., chief inspector of mines of Nova Scotia, in his latest report, *The Minerals of Nova Scotia* (Halifax, 1901), furnishes very interesting data on the economies of gold mining in the colony. The figures are from the Richardson mine, and are thought to be “of particular interest, as they have materially added to the proof that deposits can be profitably mined and worked which a few years ago were considered beneath the miner’s notice.” The cost and profits, as reported by the secretary of the company for 1897, were as follows:

FORTY-STAMP MILL.

Total tons crushed	tons..	25,300
Total gold won	ounces..	2,879
Product per ton	2 pennyweights 6½ grains	
Cost per ton:		
Labor		\$1.15½
All charges, including renewals to machinery		1.83½

Cost of working and all expenses in connection with the Richardson mine, Isaacs Harbor, Nova Scotia, for month of May, 1898, embracing everything except insurance and wear and tear of machinery:

Wages—

14 drill men	\$475. 25
23 rock men	615. 90
4 deck hands	102. 00
5 quarrymen	163. 40
2 engine drivers at pit	83. 70
2 timber men	66. 70
2 brakemen at pit head	61. 80
2 trolley men at pit head	59. 85
1 foreman	48. 00
1 night foreman	39. 00
2 blacksmiths	96. 20
2 teamsters	78. 15
1 chief engineer	55. 00
1 amalgamator	51. 00
2 engine drivers at mill	78. 50
2 carpenters	68. 40
8 mill hands	219. 90
Management	100. 00
Total	2, 462. 75

Other expenses—

140 tons coal	182. 00
19 boxes candles (570 pounds)	171. 00
Half jar quicksilver (37½ pounds)	20. 62
Oil	10. 00
Wear of shoes and dies	50. 00
Cams and tappets	50. 00
Waste	5. 00
Timber	10. 00
Shovels, picks, drills, and handles	15. 00
Dynamite, fuse, and caps	111. 57
Horse feed	60. 00
Royalty	101. 80
Miscellaneous	25. 00
Total	811. 99

Dr. Gilpin further quotes from a paper read by Mr. W. L. Libbey at a late meeting of the Nova Scotia Mining Society on the comparative cost of hand and machine drilling:

The extreme depth perpendicularly of the working of the mine is 450 feet. The figures given include the cost of sinking and drifting, and also in the first table is covered the cost of excavating a large chamber to hold a double-plunger Northey pump and a cistern capable of holding mine water for twelve hours.

During six months from May 1, 1897, to November 1, 1897, 5,606 tons of ore were sent to the mill at an average cost of \$2.54 per ton, as follows, for ore landed at the rock breaker:

Labor (which includes blacksmiths and deck men)	\$11, 173. 99
Timber and poles	392. 40
Shovels	35. 20
Picks	20. 60
Blacksmith's coal, 6 tons, at \$10.66 per ton	63. 96
Charcoal, 300 bushels, at 15 cents per bushel	45. 00
Axes	5. 00
Hoisting ropes (estimated)	50. 00
Candles	364. 29
Loss of steel	71. 82
Fuel at pumping station and mill	1, 046. 00
Explosives	654. 75
Iron, including rails for tracks	126. 70
Miscellaneous expenses	125. 00
Lumber	45. 00
Total	14, 219. 91

Following are the figures for three months of work with the air plant. It should be borne in mind that not only have green men been broken in, but the method of stoping is being gradually changed from breast stoping to back stoping. The results are especially gratifying to the Brookfield Mining Company, as many old timers have flatly stated that a small lead could not be worked as cheaply by an air plant as by hand labor, and in one instance recently an air plant has been discontinued and a return made to hand drilling. The months taken are January, February, and March, 1898, during which time 2,840 tons were sent to the mill at an average cost of \$2.44 per ton, as follows, for ore landed at the rock breaker:

Labor (which includes blacksmiths and deck men).....	\$5, 078. 95
Timber and poles	198. 80
Shovels.....	10. 00
Picks.....	2. 00
Blacksmith's coal, 4½ tons at \$10.66.....	47. 97
Charcoal, 150 bushels at 15 cents	22. 50
Hoisting ropes	25. 00
Candles	171. 00
Loss of steel.....	11. 25
Fuel at pumping station and mill	717. 00
Explosives.....	512. 50
Iron, including rails for tracks	43. 45
Miscellaneous expenses.....	75. 00
Lumber	25. 00
Total	6, 940. 42

The result thus far is apparently to place our ore at the deck head 10 cents per ton cheaper with an air plant than by hand work. We are, however, doing more than 25 per cent more of sinking and drifting with the air plant than formerly by hand. In fact, it would be impossible to place men enough in the mine to equal by hand the work now done by power.

Following is a table showing the expense of running the 20-stamp mill for six months, commencing September 1, 1897, and ending February 1, 1898. During this time 5,910 tons of ore were milled and concentrated at an average cost of 60 cents:

Fuel.....	\$876. 00
Labor:	
2 firemen.....	360. 00
3 amalgamators.....	900. 00
2 concentrator boys.....	252. 00
1 carpenter	242. 65
1 engineer	300. 00
Miscellaneous expenses, including lubricants.....	75. 00
Cost total for shoes and dies	397. 53
Mercury lost, 79½ pounds at 60 cents	47. 55
Screen wire, 192 feet at 50 cents.....	96. 00
Total.....	3, 546. 73

Brief extracts are given from a paper which was read by Mr. C. F. Andrews at the Montreal meeting of the Canadian Mining Society in 1897 on the subject of economies in mining.

At the Richardson mine, Stormont, the lead has been found to be from 6 to 18 feet wide. In 1894 the mill contained 20 stamps, and the cost of mining and milling was \$2.90 per ton, inclusive of taxes, insurance, depreciation, and all charges. The belt was composed for the most part of one large lode from 1 to 4 feet in thickness and a varying number of small lodes intermixed with slate. In places nearly the entire belt is quartz. The slate is auriferous as well as the quartz. Shortly after that date the mine was remodeled in every respect, so that 9 hand drills could produce regularly 2,000 tons of ore per month. The mill was enlarged to 40 stamps of 850 pounds weight each, dropping 99 times per minute and crushing very finely. With this plant, lighted by electricity and driven by a central engine, the cost of mining and milling, including all charges, was \$1.65 per ton. The belt is very heavily mineralized, and the concentrates show gold up to 5 ounces per ton.

ONTARIO.

[From the Report of the Bureau of Mines of Ontario, 1901.]

The output of gold and silver for 1900 as reported to the Bureau is shown in the table given below :

Metal.	Quantity.	Value.
	<i>Ounces.</i>	
Gold	18, 767	\$297, 861
Silver	160, 612	96, 367

The following table gives a comparison of the values of gold and silver products in 1898, 1899, and 1900 :

Metal.	1898.	1899.	1900.
Gold	\$275, 078	\$124, 568	\$297, 861
Silver	51, 960	65, 575	96, 367

STATISTICS AND THEIR COLLECTION.

A word may be said here as to the collection of statistics. On the whole, the miners and producers of minerals make prompt and satisfactory returns of their output, as they are required by law to do, both for the several quarters of the year and for the twelve months ending December 31. Occasionally, however, the information is delayed, or grudgingly given, or furnished only in part; and it is therefore difficult to publish the returns for the quarter or year as promptly after the conclusion thereof as is desirable. In a few instances the figures of output and value received are viewed with misgivings founded on other sources of information, yet no recourse is open but to accept them, since they are certified as correct and are supplied by those who are in a position to know the facts, namely, the producers themselves. Now, no argument is needed at this day to prove the value of statistics. They are to any industry what the physician's thermometer is to his patient or the barometer to the weather. By their rise or fall, the increases, decreases, or changes which they chronicle, they reveal the state of the industry to which they relate and indicate what, if any, steps are necessary in order to stimulate growth or arrest decay. But to serve their purpose statistics must be at least approximately correct. Dealing with the aggregate of the mineral production of the Province, there is no reason to doubt that the statistics published annually by the Bureau answer this description. Certainly no effort is spared to achieve complete accuracy, and if there is any failure it is chargeable not to want of diligence in attempting to obtain the facts, but to neglect on the part of owners of mines or works or disinclination to impart the truth, due either to the fear that business interests would be injured by making correct returns or to some other similar motive. Such a policy is at best a short-sighted one and apt to lead to its own defeat; and it is gratifying to be able to state that it does not obtain to any extent in the mining industry of the Province.

It has sometimes been urged that returns of production should be published from individual mines and works, and it has been alleged that the adoption of such a course would tend to the investment of capital in mining enterprises by furnishing the details for which investors naturally look. Another reason advanced is that it would afford a measure of protection to the shareholders of any mining company whose management might be inclined to withhold information or misrepresent the facts.

It is no doubt true that detailed statistics showing, for instance, number of tons of ore treated, yield of metal or other product, value of same, expense of working, etc., published monthly or quarterly, would be of interest and value if the figures covered a considerable number of steadily producing mines of the same kind—say of gold. But at the present stage of the industry in Ontario, when steady production of bullion is not the rule among the gold mines, even those equipped with stamp mills, and where a great deal of the work done is of a prospecting and experimental character, publication of such particulars would be of little service to investors, and might even lead to erroneous impressions as to the value of particular properties. When a considerable number of mines are yielding their quota of gold day in and

day out the year round and the industry has established itself on a permanent and satisfactory basis, detailed statistics of individual properties will cover a field large enough and a variety of circumstances great enough to possess real worth as a guide for the prospective investor, and there will then be much less difficulty in procuring them than there would be now. As to safeguarding the interests of shareholders or the public who buy mining stocks, still confining the case to gold mines, it may be said that the four mines now regularly turning out gold are all worked by English capital and that none of their stock is for sale on the Canadian market.

One word more, as to the method of valuing the products of mines or works. The basis is adhered to which has been used from the beginning, namely, the selling value at the mine or works.

GOLD AND SILVER.

The yield of gold in 1900 was 18,767 ounces, valued at \$297,861, as compared with 27,594 ounces, worth \$424,568, in 1899. Bullion was produced on 18 properties as against 15 last year. Statistics of gold mining for the last five years are given in the following table:

Schedule.	1896.	1897.	1898.	1899.	1900.
Mines worked.....number..	8	9	17	15	18
Men above ground.....do....	103	222	296	307	412
Men under ground.....do....	86	216	284	356	338
Ore treated.....tons..	13,292	27,589	57,895	59,615	46,618
Gold product.....ounces..	7,154	11,412	16,261	27,594	18,767
Gold value	\$121,848	\$150,244	\$275,078	\$424,568	\$297,861
Wages paid for labor	\$91,210	\$217,766	\$290,919	\$324,024	\$350,694

The immediate cause of the diminution in the output of bullion was the stoppage of several producing mines in western Ontario, notably the Golden Star and Olive, whose mills ran for only a portion of the year. The western gold fields have no doubt been the scene of much mismanagement and waste of money in ill-directed efforts at mining, and it can not be denied that among the companies which have been formed there are those which have devoted more of their energies to the sale of stock than to the work of sinking on their veins. Some have spent their funds in attempts to find paying ore in barren country rock; some on promising locations have reached the end of their money in the early stages of development and have been obliged to stop with an unproven and unsalable mine on their hands because unable to obtain more capital with which to go on, while others have committed the evergreen blunder of putting up expensive mills and plants before demonstrating the continuity and richness of their deposits. The gold ores of western Ontario are not high in grade, but for the most part they are free milling, and the veins are of good size. There is abundance of wood, water, and good labor; and mining, when conducted with skill and prudence, can reasonably look for an abundant reward.

The falling off in gold produced was to some extent made up by the increased output of silver, of which 160,612 ounces, worth \$96,367, were produced in 1900, compared with 105,467 ounces, valued at \$65,575, in 1899. The silver-mining statistics for the last three years are given in the following table, showing a constant and somewhat rapid increase since the revival of this branch of mining in 1898:

Schedule.	1898.	1899.	1900.
Ore raised.....tons..	6,600	8,000	12,500
Ore stamped.....do....	5,600	8,000	8,000
Bullion product.....ounces..	86,600	105,467	160,612
Value of bullion.....	\$51,960	\$65,575	\$96,367
Wages paid for labor	\$28,430	\$29,000	\$24,000
Average workmen above ground.....number..	32	23	20
Average workmen below ground.....do....	27	17	30

CENTRAL AMERICAN STATES.

The United States consul at Nicaragua has forwarded through Minister Merry, at Costa Rica, the figures showing the production of gold in Nicaragua during 1900, which he states was 69,475 kilograms, but does not state the value nor the fineness of the kilograms.

Minister Merry, of Costa Rica, gives the production of gold in Costa Rica for 1900 at \$154,174.

In the absence of definite information this Bureau will have to pursue the course followed in the past, which is to accept the exports from the Central American States as their product.

The imports of gold and silver (ore and bullion) into the United States from the Central American States during 1900 was: Gold, \$500,000, equivalent to 24,188 ounces, or 752 kilograms, fine; silver, \$614,538 (commercial value).

The annual statement of the trade of the United Kingdom with foreign countries contains an item, "Metals and ores," for Honduras only, giving the value of silver ore imported to the United Kingdom from that country, viz: In 1898, £2,645; in 1899, £1,250; in 1900, £2,815. The item is not separately stated for any other of the Central American States, which means either that there were no imports of that description, or that they were not of sufficient amount to be separately stated and were included under "All other articles." No imports of gold or silver bullion were stated as coming from Central America.

The German customs statistics of the German Empire show the following imports for 1897, 1898, and 1899:

Classification and country from which imported.	Value.		
	1897.	1898.	1899.
Costa Rica:			
Gold.....	<i>Marks.</i> 8,000	<i>Marks.</i>	<i>Marks.</i>
Guatemala:			
Gold.....	17,000		
Silver.....	1,000		
Honduras, Nicaragua, and Salvador:			
Gold.....	3,000	17,000	8,000
Gold ore.....	590,000	46,000	
Silver.....			6,000
Silver ore.....		1,000	

No lead or lead ores were imported to Germany from Central America.

The French and Belgian customs statistics contain no separate statement of imports of the precious metals or gold and silver ores from Central America, which shows that there were none, or that the amounts were too insignificant to be separately stated.

The imports of foreign silver ores to Italy from all countries are very insignificant. (See article on Italy.) The imports from Central America, if any, are a negligible quantity. Spanish customs statistics for 1899 show no imports of gold or silver bullion or ores from Central America. This exhausts the list of countries importing silver for refining.

The figures of imports from Central America to the United States and European countries are evidently below those of the exports from Central America, as appears from the report of the German Imperial consul at Honduras, who gives the exports for the year 1899, from Honduras alone, at 2,887,000 marks (\$687,106 commercial value) for silver bars, and 30,000 marks (\$7,140) for gold and silver ores. (Deutsches Handels-Archiv, February, 1901, p. 139.)

With this qualification, the following table is made from the import figures stated above:

GOLD.

Country to which exported.	1898.	1899.	1900.
United States.....	\$473,740	\$584,245	\$500,000
Great Britain.....	14,991	1,904	.....
Germany.....	.....	.....	.....
Total	488,731	586,149	500,000

SILVER (COMMERCIAL VALUE).

United States.....	\$409,573	\$539,791	\$614,538
Great Britain.....	12,872	6,083	13,699
Germany.....	238	1,428	.....
Total	422,683	547,302	628,237

The above value of gold for 1898 represents 23,642 ounces, or 735 kilograms, fine; for 1899, 28,355 ounces, or 881 kilograms, fine, and for 1900, 24,188 ounces, or 752 kilograms, fine. The commercial value of the silver represents, for 1898, 716,412 ounces, or 22,288 kilograms, fine, of a coining value of \$926,270; for 1899, 912,170 ounces, or 28,377 kilograms, fine, of a coining value of \$1,179,371, and for 1900, 1,013,285 ounces, or 31,523 kilograms, fine, of a coining value of \$1,310,106.

CHILE.

No official information has been received by this Bureau relative to the production of gold and silver in 1899 and 1900.

The table for the gold production, given below, is reproduced from the *Revista Comercial e Industrial de Minas* (June 15, 1901, pp. 151-152), a leading mining journal published at Santiago de Chile. The annual production is computed from the official figures relating to exports and coinage:

PRODUCTION OF GOLD IN 1899 AND 1900.

Description.	1899.		1900.	
	Fine weight.	Value.	Fine weight.	Value.
Exports:	<i>Grams.</i>	<i>£. s. d.</i>	<i>Grams.</i>	<i>£. s. d.</i>
Gold bars.....	1,625,000	.....	2,120,403	.....
Gold ore (fine contents).....	1,840	.....	2,680	.....
Total exports.....	1,626,840	234,264 16 9½	2,123,083	305,725 11 0½
Purchased by the mint.....	327,092	44,648 2 10	325,921	44,488 5 8½
Grand total.....	11,953,932	278,912 19 7½	12,449,004	350,213 15 9

¹ This fine weight for 1899 gives a value of \$1,298,583, representing 62,819 ounces, fine; and for 1900, a value of \$1,627,608, corresponding to 78,735 ounces, fine.

The figures for the silver production are taken from the quarterly publication of the National Society of Mining Engineers of Chile. According to that source (*Boletín de la Sociedad Nacional de Minería*, June-August, 1901, p. 185), the silver production of Chile in 1899 was 129,502.835 kilograms, valued at 33.55 pesos (of 38d.) per kilogram. Taking the weight as fine, the coining value would be \$5,382,100, corresponding to 4,162,718 ounces, fine.

There is no information available for the silver production of 1900, which is therefore assumed to be equal to that of the preceding year.

CHINA.

China prepares no official figures as to her production of the precious metals. In last year's report the export statistics published by order of the inspector-general of customs were taken as a foundation for an estimate of the gold production.

The imports of gold bullion from China into Germany for 1900 was, according to the information received from Mr. A. Sauerbeck, 4,553 kilograms, fine, representing a value of \$3,025,924, which is an increase of \$1,199,603 over similar imports for 1899.

Mr. F. E. Taylor, statistical secretary to the inspector-general of customs at Shanghai, says, in his report on the foreign trade of China for the year 1900:

The recorded movements of gold and silver bullion between China and foreign countries show a net import of gold worth 1,202,315 haikwan taels and a net import of silver to the value of 15,442,212 haikwan taels. These figures represent only such movements of bullion as came under the notice of the customs and must not be taken as even approximately correct as regards imports. There was an enormous import of silver in the shape of British, French, and Mexican dollars, brought by the military authorities.

The export of gold, coming principally from Manchuria, was checked by the war. On the other hand, large quantities of gold coins, chiefly from Japan, were imported by the banks for sale to Chinese, who bought them freely, as conveniently portable during a period of suspense.

For the reasons stated in these lines, the export statistics for 1900 offer no indication as to the gold production of the year. The figures for 1899 are therefore repeated.

COLOMBIA.

No statistics of the precious metals are published in Colombia. Her official statistics of imports and exports do not specify the precious metals or ores. The production must therefore be ascertained from the import statistics of the United States and other countries.

The following is a statement of the imports of gold and silver, exclusive of coin, from Colombia into the United States, compiled by the Bureau of Statistics of the Treasury Department.

IMPORTS FROM COLOMBIA DURING THE YEAR 1900.

Description.	Weight.	Value.
Gold:	<i>Ounces.</i>	
Bullion	13,940	\$287,187
Silver:		
Bullion	189,043	113,426
Ore	(?)	15,465
Total.....	(?)	128,891

The British annual of the trade of the United Kingdom with foreign countries gives the following statistics of imports from Colombia to the United Kingdom:

Description.	1898.	1899.	1900.
Gold bullion..... ounces.....	103,419	84,907	47,903
Silver bullion..... do.....	5,151,165	3,349,540	1,774,370
Silver ore (value)	£86,667	£43,010	£1,909

No gold ore was imported into Great Britain from Colombia.

According to the customs statistics of the German Empire, Germany imported no silver from Colombia. Her imports of gold, crude and in bars, from that country were valued in 1898 at 125,000 marks, and in 1899 at 212,000 marks.

France, according to her official customs statistics, imported from Colombia, in 1899, 2,255 kilograms of gold ore, valued at 33 francs per kilogram; no silver was imported.

The customs statistics of Belgium and Spain state no imports of the precious metals or ores from Colombia. The imports, if any, from Colombia into Italy are a negligible quantity, in view of the insignificant amount of foreign silver ores refined in the latter country. This exhausts the list of silver-refining countries.

The foregoing figures are reduced to fine ounces and United States values, and summarized in the following table:

COLUMBIAN EXPORTS.

Countries importing.	1898.	1899.	1900.
Gold:			
United States.....	\$169,210	\$170,849	\$287,187
Great Britain.....	1,959,711	1,608,910	907,721
Germany.....	29,750	50,456	.....
France.....	.....	14,362	.....
Total.....	2,158,671	1,844,577	1,194,908
Silver (coining value):			
United States.....	5,216	96,182	268,786
Great Britain.....	7,084,844	4,456,950	2,141,448
Total.....	7,090,060	4,553,132	2,410,234

FINE WEIGHT AND VALUE OF COLOMBIAN EXPORTS.

GOLD.

Year.	Weight (fine).		Coining value.
	Kilograms.	Ounces.	
1898.....	3,248	104,426	\$2,158,671
1899.....	2,775	89,231	1,844,577
1900.....	1,798	57,804	1,194,908

SILVER.

1898.....	170,598	5,483,718	\$7,090,060
1899.....	109,556	3,521,563	4,553,132
1900.....	57,994	1,864,165	2,410,234

EAST INDIES.

BRITISH.

NEW GUINEA.

This Bureau has no information regarding the gold product of New Guinea for 1900, and assumes that the product for 1900 was equal to that of 1899—i. e., £44,185, or \$215,026.

According to information received from Consul-General Campbell, at Singapore, the production of gold in the Federated Malay States for 1900 was 17,240 ounces, which, at \$38 (Mexican) per ounce, is valued at \$655,142 (Mexican).

The average value of the Mexican dollar during 1900 was \$0.544, which gives a value to the above product, in United States currency, of \$356,397. The total product of British East Indies is \$571,423, corresponding to 27,643 ounces, or 860 kilograms, fine.

The gold production of New Guinea, according to the Statistical Register of Western Australia for 1899 (pp. 47, 48) was as follows:

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	<i>Ounces.</i>			<i>Ounces.</i>	
1890.....	3,470	£12,440	1896.....	1,373	£4,735
1891.....	2,426	8,371	1897.....	7,148	25,018
1892.....	1,235	4,322	1898.....	6,830	23,905
1893.....	592	2,236	1899 ^a	12,012	44,185
1894.....	1,128	3,906			
1895.....	728	2,565	Total	36,942	131,683

^a For the year ended June 30, 1900. The product for the calendar year is assumed to be equal to that for the fiscal year.

DUTCH.

Minister Newel, at The Hague, Netherlands, reports that the product of the precious metals in the Dutch East Indies during 1900 was—gold, 659 kilograms, valued at 1,082,000 florins, or \$434,964, representing 21,041 ounces, or 654 kilograms, fine; silver, 2,661 kilograms, valued at 124,400 florins, or \$50,008, commercial value, representing 80,659 ounces, or 2,509 kilograms, fine, with a coining value of \$104,286.

[From Jaareiffers voor het Koninkrijk der Nederlanden Kolonien, 1899 pp. 49, 130.]

1. BORNEO.

PRODUCTION OF GOLD.

Year:	Kilograms.	Year:	Kilograms.
1890.....	62	1895.....	111
1891.....	94	1896.....	96
1892.....	98	1897.....	98
1893.....	136	1898.....	119
1894.....	112	1899.....	103

2. SUMATRA.

The production of the precious metals at Palembang in 1899 was as follows: Gold, 10 kilograms; silver, 58 kilograms.

3. CELEBES.

The production of gold ore at Menado was as follows:

Year:	Kilograms.	Year:	Kilograms.
1896	140, 088	1898	122, 000
1897	247, 500	1899	280, 000

AMERICAN.

GOLD IN THE PHILIPPINES.

By F. F. HILDER, Bureau of American Ethnology.

[From The National Geographic Magazine, Vol. XI, December, 1900.]

In an article which I wrote for the National Geographic Magazine in 1898 (National Geographic Magazine, Vol. IX, No. 6, June, 1898) I referred to the existence of gold in the Philippine Islands in the following terms:

"Gold has been found in several of the provinces, but chiefly in the more mountainous and inaccessible localities, many of which are occupied by independent tribes that have never submitted to Spanish rule; but that the auriferous formations extend over a wide area in the island of Luzon is proved by the fact that in the alluvial deposits of every stream on the Pacific side some color of gold can be found.

"The islands of Mindanao and Mindora are also equally promising fields for prospectors of gold. In many places the natives have extracted considerable quantities of gold dust by washing the alluvial deposits; in others gold-bearing rock is broken by them with hammers and ground in rude mills, such crude methods, of course, producing but poor results."

During the present year I have again visited the Philippines; and, although existing conditions were such that I could not personally visit the gold-bearing districts, I was enabled to obtain considerable information with respect to them from sources which I consider to be thoroughly reliable, and have inspected a number of samples of gold obtained from different localities. In the island of Luzon there are few provinces in which gold does not exist, in greater or less quantity, in veins and ledges in the mountains or in the river sands and alluvial deposits.

One of the best known auriferous districts is that of Paracale, in the province of Camarines Norte, on the eastern coast of Luzon, where, in the spurs of the mountains many veins and outcroppings of gold-bearing rock have been uncovered, particularly at Pinagalatinan, Imbongimbong, and Lugos, near Labo. In the former places the gold is in combination with iron pyrites, with a trace of copper, blende, galena, and chromate of lead in orange-colored crystals. In Labo the streaks or veins are gray in color, containing gold, blende, iron pyrites, and sometimes, although seldom, native copper. The general direction of these strata is from north to south, except in Gumihau and Lugos mountains, in which the trend is to the northwest. The width of the veins is from 1 to 5 inches up to 26 to 36 inches. Foreman mentions this district as follows (The Philippine Islands, by John Foreman, New York, 1899, p. 380):

"In the time of Pedro Manuel Arandia (1754-1759) a certain Francisco Estorgo obtained license to work these Paracale mines, and five veins are said to have been struck. The first was in the Lipa Mountain, where the mine was called 'San Nicolas de Tolentino;' the second, in the Dobojan Mountain, was called 'Nuestra Señora de a Soledad de Puerta Vaga;' the third, in Lipara, was named 'Mina de las Animas;' the fourth, in the territory of San Antonio, took the name of 'San Francisco,' and the fifth, in the Minapa Mountains, was named 'Nuestra Señora de los Dolores,' all in the district of Paracale near the village of Mambulao."

He also says (op. cit., p. 381):

"Estorgo's neighbors, instigated by native legal pettifoggers in Manila, raised endless lawsuits against him; his means were exhausted and apparatus was wanted to work the mines, so he abandoned them."

These mines are at present operated by the natives, but in such a rudimentary and desultory manner that only a small portion of the gold is saved. The workings are seldom carried to a greater depth than 3 or 4 meters, but it is a fact which promises better results, whenever more scientific and practical methods may be brought to bear on them, that the ore always becomes richer as the depth is increased; but in all the hundreds of years during which these deposits have been known it is safe to say that their true value has never been tested. The natives carry the ore to the surface in baskets, and when water is struck they bale it out with buckets, either

pulling them up with a rope or carrying them up a bamboo ladder. The gold-bearing rock is emptied from the baskets into a concavity in a rock or large stone, which serves as a mortar. The pestle or stamp consists of a stone about 25 pounds in weight, which is tied with a strip of bejuco to the end of a slender pole, which is rested obliquely against the fork of a tree. The laborer, taking advantage of the elasticity of the pole, uses it like a trip hammer and crushes the rock. The broken rock is then pulverized in a rude mill, consisting of a rough stone roller, which is revolved in a circular base by means of buffaloes.

The pulverized material is then washed, generally by women, until there remains only a dark sediment, which is afterwards smelted by placing it in a shell, covering it with charcoal, and using a small piece of bamboo as a blowpipe.

A sample of the metal obtained by this imperfect process gave the following analysis:

	Per cent.
Gold	77.94
Silver	19
Iron.....	.05
Silica.....	3
Loss.....	.01
	100

Of course, the quantity of gold obtained is a very small fraction of that carried by the ore, and, as the gold is bartered to Chinese peddlers and ambulant traders, the producers get but small return for their labor and are miserably poor. The ground between the mountains and the coast is mostly alluvial, and the village of Mambulao in this district has long been noted for the placer washings in its vicinity.

In the adjoining province of Tayabas gold has also been found in the hills or mountains around the town of Altimonan; also in many of the spurs of the Caraballo Mountains, in alluvial deposits in the Gapan country, and in the sands of the rivers Ango and Angalacan, in the province of Nueva Ecija, and in many places in the Caraballo de Baler country, between that province and that of Nueva Viscaya. On the island of Polillo, lying off the east coast, it has also been obtained from the shores of the river of the same name. In the north of the province of Cagayan it has been found in the districts around the town of Pamplona; in the townships of Lanag and Bangui, in the province of Ilocos Norte; in the sands of the river Abra, which discharges near the town of Vigan, on the coast of Ilocos Sur. It has also been found in many places in the country inhabited by the Igorrotes and Igorrote-Chinese, in the district of Benguet, particularly near the villages of Gatapa, Bagnio, Capunga, Lital, Automac, and Pangotcotan, near the latter of which some mines were worked by Mexicans during the last century; in the township of Batinecoquin, in the north of Zambales Province; in the rivers near the towns of Santa Maria and San Jose, of Bulacan; in the Tierras de Caramoan, in the province of Camarines Sur; in the township of Ligao, in Albay; in the rivers of Lanating and Cayguran, in the province of Morong, and in the ravines and creeks of Macaburaboc and Camandag, near the town of Montalban, in the province of Manila. It will thus be seen that gold is widely distributed throughout the island of Luzon. How many of these deposits will prove to be rich enough to pay for systematic work and the introduction of machinery remains a problem which the future must solve, but I know that the owners of some of them are sanguine of securing good results whenever the country may be pacified and capital and labor shall be protected under American control.

In the great southern island of Mindanao gold has been found in many places, principally on the northern and eastern coasts, where its production has been entirely in the hands of the natives. What may exist in the interior is problematic, as the greater part of the island is unexplored. In the district of Misamis, in the north-west, there exist many alluvial diggings in the country between the Cagayan and Iligan rivers. The principal placers are near the towns of Initao and Iponan, where nuggets have been found weighing as much as 1 to 2 ounces. In the neighborhood of Pigholugan, near Cagayan, small veins of auriferous quartz exist, from which, even by the crude native methods, considerable quantities of gold have been taken.

The gold-bearing district of Surigao may be considered as an eastern continuation of that of Cagayan de Misamis, and is of more importance, including the greater part of the district of the Canimon, Binutong, and the Canmarhat Mountain, and the plains of Caningay. There are also deposits in Magong-Duangan and Danas, in the township of Caganan; placers in the township of Tibabangan, near Maquit, on the edge of Lake Sapongan; in the Tubay River, which discharges into the Bay of Butuan; also about four days' journey from the mouth of the Butuan River, near the villages of Lines, Finon, and Sulibas. In the veins and outcroppings in this district

the gold is found mingled with pyrites of iron and copper, galena, and blende. I have seen a report in which it was stated that in a ledge near Canimon there had been found ore so rich that as high as 100 ounces of gold had been obtained from 75 feet of the vein.

The productiveness of this Surigao district has been known for centuries, but for many reasons the extraction of gold has remained in the hands of the natives. Foreman says (*op. cit.*, p. 382):

"A friend of mine, a French merchant in Manila, told me in 1886 that for a long time he received monthly remittances of $4\frac{1}{2}$ to $5\frac{1}{2}$ pounds of alluvial gold from the Surigao coast, extracted by the natives on their own account. In the same district a Spaniard attempted to organize labor for gold, washing on systematic principles, but he met with such opposition from the friars who influenced the natives that he could only have continued his project at the risk of his life, so he gave it up."

Sir John Bowring also mentions the Mindanao gold production (*The Philippine Islands*, by Sir John Bowring, London, 1859, p. 279):

"Gold dust is the instrument of exchange in the interior of Mindanao, and is carried about in bags for the ordinary purposes of life."

While I was in Manila in April last (1900) Mr. G. E. St. Clair, a mining engineer and expert of considerable experience, returned from a trip to the southern islands. He said that from the result of his investigation he regarded the island of Mindanao as one of the richest countries he has ever visited, considered from a mineral standpoint.

Gold has also been found in the island of Panay. The most notable locations are those in the vicinity of Astorga, in the township of Dumarao, in the beds of the creeks known as Calaomin and Dinogo. In this neighborhood are found dioritic rock containing numerous small veins of gold-bearing iron pyrites, rich enough to pay for working. Deposits of gold exist in Binatusan and Lausam, below Mantubang, also in the country between the junction of the rivers Manyon and Badbaran with the river Panay. In the province of Iloilo the most noticeable gold deposits are those in the Abaca section of the township of San Curique, and those of the township of Barotoc Viejo, in the northeast of the island, which are reported to be very rich.

This description includes the best known gold-bearing localities; but indications in several other islands, such as Cebu, Mindoro, Masbate, Negros, Palawan, and other smaller islands are such as to lead to the belief that the metal will be found in them whenever they may be explored and prospected. The reasons why the gold deposits in the Philippines have never been exploited or properly utilized are so many and so varied that no adequate relation of them can be given within the limits of a magazine article. Some of them are, however, summarized in the following extract from Foreman's book (*op. cit.*, p. 384):

"As a general rule, failure in most Philippine mining speculations, no doubt, was due to the unwillingness of the natives to cooperate with European capitalists, and in this they found encouragement from the friars, who were averse to innovation of any kind. The native, too, in rural districts would not submit to constant organized and methodical labor at a daily wage, to be paid periodically when he had finished his work. The class of natives whom one had to employ in the neighborhood of the mines was nomadic and half subjected, while there was no legislation whatever in operation regulating the relations between workers and capitalists. Indeed, the latter were quite at the mercy of the former, whose indolence entirely overcame their cupidity, so long as their immediate necessities were satisfied. * * * Again, the wretched means of communication provided by the Spanish Government obliged the few enterprising capitalists to spend their money on the construction of roads which had already been paid for in taxes."

It is to be hoped that after centuries of oppression, misrule, apathy, and neglect a better and brighter day is dawning for these beautiful islands; when their abundant stores of mineral and vegetal wealth will be developed and utilized; when both capital and labor will be encouraged and protected, not only in the interest of the former, but to the immeasurable benefit and advancement of the people who will supply the latter.

MINERALS OF THE PHILIPPINES.

[From *The Mining and Scientific Press*, San Francisco, May 18, 1901, p. 231.]

Prospectors have been coming to the islands from other countries as long ago as forty years. The principal gold mines were found in the provinces of Camarines Norte, and considerable metal was taken out.

In recent years gold has been found in Mindanao, and at the present time there are several mines operating there, some having modern machinery. The grasshop-

per eaters of Mindanao have for a long time been coming into the cities and towns with little nuggets of gold which they traded for articles of food, wear, and general supplies.

The mountain tribes of Cimeras and Negros have also found gold in places and have managed to market some of it. The natives are very close about revealing the whereabouts of the mines, for they appreciate the value of a mine, even though they allow themselves to be cheated greatly when selling the product to others. Gold has been taken out in paying quantities at Tagsulip, Cuená, Misamis, and on Panay the soldiers have found gold in the mountains in the interior.

There will be little done, however, in gold mining until quartz-crushing machinery is put in. The natives, Spaniards, and Chinese have taken and worked much of the surface or placer mines. There is, however, an opportunity for quartz mining, and lodes can be secured in many sections of the archipelago containing paying quantities of gold.

Quartz veins have been located in Mindanao, Luzon, Panay, Negros, and Cebu. For a time the Spanish Government kept records of all mining enterprises, and a large royalty of the gold mined had to be turned over to the King of Spain.

The former famous Mambulo mines produced at one time about 3,000 ounces of gold monthly, the market price of which was about \$20 an ounce. These old mines were worked by the natives long before the Spaniards came. Ultimately they passed into the hands of an English syndicate. The English failed to secure profitable returns from their investment. They employed the wrong kind of labor. The Spaniards, knowing the people of the islands, employed Chinese to operate the mines and made money. The English discharged the Chinese and put in natives, who would work a few weeks and quit until they spent the money earned.

The native labor can be hired for 10 or 15 cents per day for mining work, but will not work steadily. The Chinese can be secured at practically the same rates and there are thousands of them available, but many foreign firms will not hire them. The writer has seen mines in which the labor is all Chinese, with Chinese foremen and white superintendents, and these mines are paying, while mines in which the labor is all Filipino are usually the reverse. The individual native miners depend upon finding pieces of the precious metal in the crevices in the mountains, and often months are devoted to a search which will result in the finding of a small piece of gold. One can not remain in any portion of the islands long without hearing mining stories from natives and soldiers concerning the existence of placer deposits and of streams the beds of which contain fine grains of gold. The sands of these streams when washed show color, oftentimes in paying quantities. Your correspondent has witnessed the washing of stream sands, and on several occasions beach sand, with the result that payable gold deposits have been located.

SILVER MINES.

A number of Australians and some capitalists from Montana have been in the islands prospecting for silver for several months. They have located what they claim to be paying claims on the island of Mindanao and are selling stock in Manila. It is stated that these new mining concerns will operate on a large scale. They propose to have the roads put in such shape that ore can be moved as desired. At present mining is seriously hindered owing to bad roads and lack of machinery.

ECUADOR.

Minister Sampson, in his communication to this Bureau dated March 14, 1901, says that he can not give any figures showing the production of gold in Ecuador for 1900.

The *Revista Comercial*, of Guayaquil, Ecuador, is quoted by the Monthly Bulletin of the Bureau of the American Republics (May, 1901), as authority for the statement that the exports of gold from Ecuador in 1900 amounted to 162 kilograms, of the value of 137,711 sucres. Of this amount the United States imported, in 1900, a quantity valued at \$74,629, which represents 3,610 ounces, or 112 kilograms fine.

Taking the estimate of the *Revista Comercial*, the gold product of 1900 would represent a United States value of \$107,665, corresponding to 5,208 ounces fine.

[From the "Monthly Bulletin of the Bureau of the American Republics," January, 1901.]

The mineral deposits of Ecuador have long attracted attention. Among the mines in operation are gold mines in several provinces and one or two paying silver mines. Despite ample deposits Ecuador produces only about 250 kilograms of gold per year for export. In March of 1900 large deposits of copper and silver were reported as discovered by European metallurgists in the province of Azuay at a distance of 35 miles from the coast and about 5,000 feet above sea level.

ETHIOPIA.

The Moniteur des Intérêts Matériels of September 9, 1900, reports the incorporation on August 25, 1900, of a stock company, with head quarters at Brussels, for the purpose of exploiting the gold mines situated in the equatorial provinces of Abyssinia.

FINLAND.

The following information is compiled from the official reports on mining and coinage for the years 1897, 1898, and 1899, the last named issued at Helsingfors in 1901:

PRODUCTION OF GOLD AND SILVER FOR THE LAST TEN YEARS.

Year.	Gold.		Silver.	
	Weight.	Value.	Weight.	Value.
	Grams.	<i>Finnish marks.</i>	Kilograms.	<i>Finnish marks.</i>
1890.....	17,860	57,152	817.63	80,000
1891.....	8,768	28,057	1,038.32	100,000
1892.....	4,807	15,382	920	90,000
1893.....	4,120	13,184	888.83	88,000
1894.....	6,471	20,607	877.54	87,000
1895.....	9,926	31,765	450.81	45,000
1896.....	7,115	22,768	375.33	37,000
1897.....	4,593	14,697	381.19	35,000
1898.....	4,619	14,780	455.58	48,860
1899.....	2,620	8,384	244.25	26,000

The gold is obtained from washings. There were only 72 men engaged in the industry during the year 1899. The average length of the gold-washing season for all the works during the year was eighty-five days, and the total number of days worked, 1,913.

The annual reports furnish comparative data on the productivity of gold mining in Finland. The following table is compiled at this Bureau from the Finnish official reports for 1897, 1898, and 1899:

Year.	Number of days worked.	Production.	
		Quantity.	Value.
		<i>Grams.</i>	<i>Finnish marks.</i>
1899.....	1,913	2,620	8,384
1898.....	2,810	4,619	14,780
1897.....	1,921	4,593	14,697
1870-1896.....	176,929	420,071	1,348,123
Total.....	183,573	431,903	1,385,984

Upon computation it appears that 1 gram is valued at 3.20 marks. From the foregoing table we obtain the following:

Year.	Average product of day's work.	
	Quantity.	Value.
	Grams.	Finnish marks.
1899	1.372	4.39
1898	1.644	5.26
1897	2.392	7.65
1870-1896	2.377	7.62
Total	2.353	7.55

The output in 1899 was the smallest since 1870, when gold washing first commenced in Finland. The average yield per day in 1898 and 1899 showed a decline as compared with the average for the entire thirty-year period. Though the yield per day in 1897 was the same as the average for the preceding twenty-seven years, yet the total production was next to the minimum which had been known in former years, viz, 4,120 grams in 1893, and nearly three times less than the average for the thirty-year period, from 1870 to 1899, which amounted to 14,396.7 grams, valued at 46,199 marks. The greatest quantities were obtained in 1871 and 1872, when the annual output exceeded 55 kilograms. Since that time the production of gold has been steadily declining.—(From “Finland’s Officiela Statistik.” “Bergshandtering.” Ar 1897, pp. II, 1; Ar 1898, p. 1; Ar 1899, pp. VI, 1.)

From the above information it will be seen that the gold product of Finland for 1898 was 4.619 kilograms, and for 1899, 2.62 kilograms. This gives a value of \$3,070, corresponding to 149 ounces fine, for 1898, and \$1,741, representing 84 ounces fine, for 1899.

In the absence of any figures for 1900, the estimate for 1899 is repeated.

The silver product is given at 456 kilograms for 1898, and 244 kilograms for 1899. This gives a value of \$18,951, representing 14,657 ounces fine, for 1898, and \$10,141, corresponding to 7,843 ounces fine, for 1899.

The figures for 1899 are taken as the product for 1900.

FRANCE.

PRODUCTION OF THE PRECIOUS METALS.

The director of the French mint says in his latest report:

France, considered without her colonies, has no gold mines, and silver is found there only in combination with lead. It is only by adding to the refined product of French argentiferous lead the metal extracted by some refineries from imported ores that the mineral statistics of the ministry of public works arrives for 1899 at a production of 82,105 kilograms fine. The treatment of certain imported ores yielded, in the same year, 270 kilograms of fine gold.

The production of silver in France in 1899 is reported by Ambassador Porter to have been 14,500 kilograms fine, of a commercial value of 1,450,000 francs. The fine weight represents a coining value of \$602,620, corresponding to 466,089 ounces fine.

GERMANY.

According to the answers received to this Bureau's interrogatories the product of the precious metals in Germany for 1900 was as follows:

Gold production of German refineries, 3,049.57 kilograms, fine, valued at 8,508,333 marks, of which—

Refined from—	Kilograms.
Domestic ores	99.29
Foreign ores	500.93
Foreign and domestic sweepings.....	2,449.35
Total	3,049.57

Silver production of German refineries, 415,735.42 kilograms, fine, valued at 34,653,324 marks, of which

Refined from—	Kilograms.
Domestic ores	168,349.64
Foreign ores	195,697.74
Foreign and domestic tailings and sweepings	51,688.04
Total	415,735.42

As will be seen from the above, the actual yield of gold from the German mines in 1900 was comparatively insignificant, having been only 99.29 kilograms, or 3,192 ounces fine, corresponding to \$65,988. The amount of gold derived from foreign ores, imported, and smelted and refined at the various German refineries, having been credited to the countries where the mines were situated, duly appears in the statement of the world's annual production of gold. The third item yielded by the refineries and obtained from domestic and foreign by-products, sweepings, and refuse, may have, in part, been obtained from domestic auriferous silver ores, but it is impossible to state just what portion was so obtained; and as the largest part of the gold included under this head doubtless was derived from by-products, refuse, and sweepings obtained from various industrial establishments, no notice is taken of it in the estimate for the year.

Of the total amount of silver produced by the refineries in Germany for 1900 only 168,349.64 kilograms were obtained from domestic ores, and are consequently rightly to be credited to Germany. That portion obtained from foreign ores has, in the proper place, been included in the estimates of the various countries which produced it. For the reason above stated the third item, obtained from domestic and foreign by-products, sweepings, and refuse, has been disregarded in the estimate of the world's annual production.

From the foregoing the gold and silver products of German mines for 1900 can be summarized as follows:

Metal.	Weight.		Value.
	Kilograms, fine.	Ounces, fine.	
Gold	99.29	3,192	\$65,988
Silver	168,349.64	5,411,441	^a 6,996,611

^a United States coining value.

PRODUCTION OF GOLD AND SILVER IN GERMANY.

[Compiled from Die Bergwerke, Salinen u. Hütten in Deutschen Reich, 1899, pp. IV, 79, 86, 103, 108.— Translation.]

Silver is extracted in Germany from foreign ores more than from domestic ores, and not so much from silver ores proper as from lead and copper ores, domestic as well as imported, all of which contain silver.

Only a small portion of the gold product is extracted from gold ores, mostly foreign; the greater part is extracted from tailings and sweepings, domestic as well as imported.

WEIGHT AND VALUE OF THE PRODUCTION OF GOLD AND SILVER REFINERIES, 1890-1899.

Year.	Gold.		Silver	
	Kilograms, <i>fine.</i>	Marks.	Kilograms, <i>fine.</i>	Marks.
1890	2,277	6,335,000	402,257	56,060,000
1891	2,427	6,760,000	443,841	58,877,000
1892	2,549	7,094,000	487,964	57,075,000
1893	2,547	7,086,000	448,092	16,948,000
1894	3,199	8,916,000	442,822	38,503,000
1895	3,547	9,877,000	391,979	34,403,000
1896	2,487	6,916,000	428,429	38,872,000
1897	2,781	7,737,000	448,068	36,381,000
1898	2,847	7,913,000	480,578	38,157,000
1899	2,605	7,259,000	467,590	37,832,000

GREAT BRITAIN.

Secretary White, of the United States legation at London, reports the gold product of Great Britain at 415 kilograms fine, valued at £56,752.

The British Mines and Quarries for 1900 gives the same figures for gold, which is equal to 13,360 ounces, fine, of a value of \$276,176, corresponding to 415 kilograms, fine.

From the same source the product of silver is given as follows: From gold ore and argentiferous lead ore, 190,850 ounces, valued at £22,465, and extracted from foreign cupreous iron pyrites, 309,486 ounces, valued at £36,429.

This would give a total value of \$286,608, corresponding to 221,673 ounces, or 6,896 kilograms, fine, at which figures the product for 1900 is taken.

AMERICAN EMBASSY,
London, November 27, 1900.

SIR: Referring to Mr. Choate's letter of the 20th of February last, in connection with the coinage of gold and silver in Great Britain, I am directed by the ambassador and have the honor to inclose herewith a copy of a report on the production of gold and silver in this country during the year 1899, which has just been received from Her Majesty's secretary of state for foreign affairs, a copy of whose note to the ambassador, covering the same, is also herewith inclosed.

I have the honor to be, sir, your obedient servant,

JOHN RIDGELY CARTER,
Second Secretary of Embassy.

HON. GEORGE E. ROBERTS,
Director of the Mint, Department of the Treasury.

The Marquis of Lansdowne presents his compliments to Mr. Choate and, with reference to Lord Salisbury's note of June 7 last, has the honor to forward the report on the gold and silver production in Great Britain during the year 1899.

FOREIGN OFFICE, November 26, 1900.

HOME OFFICE, *Whitehall, November 16, 1900.*

SIR: With reference to your letter of February 7 last, asking that certain particulars respecting the gold and silver produced from mines in this country in 1899 might be furnished for the use of the United States Government, I am directed by the secretary of state to acquaint you, for the information of the lords commissioners of Her Majesty's treasury, that the weights and values of fine gold and fine silver produced from British mines in 1899 were as follows:

Metal.	Weight.	Value.
	<i>Kilograms.</i>	
Fine gold	88	£12,102
Silver	5,970	23,721

The value of the gold has been computed on the basis of £3 17s. 10½d. per standard ounce, consisting of 11/12 of fine metal and 1/12 alloy, and that of the silver on the average price of silver in the London market as furnished to this department by the royal mint, viz: 27½d. per standard ounce, consisting of 37/40 fine metal and 3/40 alloy.

I am, etc,

HENRY CUNYNGHAME.

The SECRETARY OF THE TREASURY.

GREECE.

According to the table in the following article the production of silver in Greece in 1899 was 36,659 kilograms, and in the absence of any information for 1900 the 1899 figures are repeated for that year. This gives a product valued at \$1,523,548, representing 1,178,369 ounces fine.

Greece has no gold mines.

The *Zeitschrift für das Berg-Hütten-u. Salinen-Wesen* (Vol. XLIX, part 2, pp. 351-382), contains an exhaustive study of the mining industry of Greece, by Mr. A. Cordella, a prominent mining engineer at Athens. The following is an abstract of his paper, in so far as it relates to the production of the precious metals:

Gold occurs in insignificant quantities in argentiferous lead and in some of the iron ores, but is not separated. Silver is found in all lead and copper ores, in quantities ranging from 0.25 to 4 kilograms per ton of base metal.

The resumption of operations in the silver-lead mines of the ancient Laurium dates back from the year 1864, when a French firm built a smelting establishment for the purpose of utilizing old slags and washings which were lying heaped around the ancient mines for many centuries. Considerable quantities of silver-bearing lead have been obtained from this source at present; it is, however, nearly exhausted. Furthermore, large quantities of slags and litharge were dredged from the sea and melted.

The silver-lead mining and smelting industry has been developed chiefly with French capital, and is now in the hands of two corporations working under concessions from the Government—*Compagnie des Mines d. Laurium*. Up to 1889 no silver was refined in Greece and all the crude silver-bearing lead was shipped to England and France. In that year the *Compagnie des Mines du Laurium*, of which the author was then general manager, built a small refinery, and on December 23 of the same year the first Laurium silver was obtained after an interval of many centuries.

The results obtained since the resumption of operations until the end of the calendar year 1899 are summarized below from the tables given in the article. The silver contents of the crude lead obtained from 1865 up to December 31, 1889, were

estimated at 280,620 kilograms. The quantities of silver contained in the lead products of subsequent years were as follows:

Year.	Quantity.	Year.	Quantity.
	<i>Kilograms.</i>		<i>Kilograms.</i>
1890	25,185	1898	42,148
1891	27,404	1899	36,659
1892	28,708		
1893	31,131	Total, 1890-1899	330,848
1894	32,212	Total, prior to 1890	280,620
1895	39,497		
1896	30,748	Total, 1865-1899	611,468
1897	37,156		

The average silver contents per ton of crude lead are given in the following table :

Year.	Fine silver per ton.	
	Compagnie des Usines du Lau- rium.	Compagnie des Mines du Lau- rium.
	<i>Kilograms.</i>	<i>Kilograms.</i>
1890	1.688	1.924
1891	1.760	1.739
1892	2.115	1.735
1893	2.362	1.781
1894	2.326	1.856
1895	2.357	2.022
1896	2.450	2.065
1897	2.576	2.050
1898	2.424	2.091
1899	2.118	1.906

THE GUIANAS.

In the following communication United States Consul Moulton, at Demerara, reports the product of the British, Dutch, and French Guianas for 1900.

BRITISH.

Gold produced, 3,509 kilograms.

This Bureau has heretofore estimated the fineness of the product of British Guiana at 0.873.

The 3,509 kilograms reported, taken at this fineness, would give a fine weight of 3,063.357 kilograms, of a value of \$2,035,907, corresponding to 98,487 ounces fine.

DUTCH.

Gold produced, 876 kilograms, valued at 1,200,500 florins.

This Bureau was informed by the United States consular agent at Parimaribo that this gold assayed 0.990 fine, which gives a fine weight of 867.24 kilograms, of a value of \$576,368, corresponding to 27,882 ounces fine.

FRENCH.

Gold produced, 2,378,477 kilograms.

As neither the value nor the fineness is stated in Mr. Moulton's communication, it is assumed to have been pure, the value of which would then be \$1,580,736, corresponding to 76,468 ounces fine.

BRITISH GUIANA.

CONSULATE OF THE UNITED STATES,
Demerara, April 9, 1901.

SIR: In pursuance of instructions, I have the honor to submit the following information concerning the production and exportation of gold in the territory embraced in this consular district for the year 1900:

The industry throughout British Guiana has undergone no important change during the year. Prospecting has been confined to the same districts, and the output has come from the same old claims, and the product was exported to England as formerly. The amount produced was 112,789 ounces. The Puruni district increased its production 3,270 ounces, and the product of the Essequibo district fell off about the same amount. The output from the former district has steadily increased from 2,548 ounces in 1892 to 13,862 ounces in 1900. The favorable showing in this locality is very encouraging, and increased activity in prospecting and development is anticipated. In the Barima and Barama districts the increased production during the year is offset by the decrease in the Cuyuni, Potaro, and Mazaruni districts.

The government royalty on gold was reduced last July from 90 cents per ounce to 70 cents, and the regulations provide that license fees, paid by any one on any claim during the year should be set off pro tanto against royalty, payable on gold from the claim. It is understood that this proviso was enacted to insure the working of claims held under license and to prevent individuals holding a number of unworked claims.

Following is a copy of the official publication of the commissioner of mines, stating the amount of gold produced in the various districts for the financial year ended March 31, 1901, expressed in kilograms:

	Kilograms.		Kilograms.
Barima	510	Essequibo.....	603
Barama.....	250	Potaro	925
Cuyuni	682	Demerara	2
Groete Creek	45		
Puruni.....	432	Total	3,509
Mazaruni	60		

Statements made by me in reports for the two preceding years regarding the currency of the colony apply to this year.

Buying and selling rates of the banks were as follows:

	Buying (per 100 pounds).	Selling (per 100 pounds).
90-day bills.....	\$477	\$482½
60-day bills.....	478	484
30-day bills.....	479	485
Demand bills.....	480	487

Dutch Guiana produced for the calendar year 876 kilograms gold, valued at 1,200,500 florins.

FRENCH GUIANA.

French Guiana produced gold during the year 1900 as follows:

	Kilograms.		Kilograms.
Mana.....	686.533	Kaw	14.228
Approuague.....	550.418	Tracouba	6.005
Siinanari	477.745	Conteste	241.498
Roura	99.236	Rourou	4.370
Maroni	170.244		
Oyapock.....	128.200	Total	2,378.477

The boundary dispute between the French Colony and Brazil was settled some months ago in favor of the latter country, and the output of gold from that district is much less than last year. French miners have abandoned that region to a great

extent and gone to other fields in the Sinnamari, Approuague, Mana, and Maroni districts, where rich discoveries are reported. I inclose a copy of the report of the commissioner of mines of British Guiana and the amended mining ordinance.

I am, sir, your obedient servant,

GEO. H. MOULTON, *Consul*.

The DIRECTOR OF THE MINT,
Washington, D. C.

GENERAL STATE OF THE GOLD INDUSTRY.

[From report of the commissioner of mines, British Guiana, for the year 1899-1900.]

DEPARTMENT OF MINES,
Georgetown, Demerara, August 20, 1900.

The gold industry showed a diminished output of only 324 ounces, 12 pennyweights, 10 grains, the respective figures being, 1898-99, 113,114 ounces, 3 pennyweights, 6 grains; 1899-1900, 112,789 ounces, 10 pennyweights, 20 grains.

The chief loss has been in the Essequibo district, where the falling off was 3,200 ounces. This was counterbalanced by an increase of 3,270 ounces in the Puruni. There was a decrease in five localities and an increase in four. The actual figures are here set forth:

Increase:	Ounces.	Decrease:	Ounces.
Puruni.....	3,270	Essequibo.....	3,200
Barima.....	1,716	Cuyuni.....	1,423
Barama.....	1,087	Potaro.....	1,157
Demerara.....	15	Mazaruni.....	625
		Groete Creek.....	10
Total.....	6,088	Total.....	6,415

The above record may be taken to show that the state of the industry was practically the same as during the previous year—that is to say that no new rich claims were found, work being confined principally to the old claims which have been discovered for some years now.

The steady increase in the output from the Puruni is most gratifying, and it is hoped that greater development may take place there this present year.

The output has risen steadily from 2,548 ounces in 1892-1893 to 13,862 ounces in 1899-1900. The Barama output has also increased, though more slowly than the Puruni, from 3,880 ounces in 1894-95 to 8,025 ounces in 1899-1900.

No mining was carried on in No. 1 district. The Kanaimapoo and Appaparoo mines in No. 2 district were not worked during the year, and spasmodic attempts only were made to resuscitate quartz mining in the northwestern district.

One thousand two hundred and thirty-nine claims were located in the various districts exclusive of No. 1. The amount of fees received for lodging the locations was \$594.72.

THE AMENDED MINING REGULATIONS.

On the 14th of July there came into force the amended mining regulations of 1899, which comprised all the changes of the mining regulations since the enactment of the regulations of 1896.

The chief changes embodied are: (a) Section 7, (1) license for prospecting and locating. A certificate that the applicant for a license is not a laborer under a subsisting contract must be first obtained from the institute of mines (free of charge).

There is unfortunately no discretionary power given under the law, and in consequence those of high degree have equally with those of the lowest to be referred to the institute for their certificates.

(b) Section 7, (3) no prospecting license can be issued to any firm, syndicate, or partnership unless the name or names of the persons comprising such firm, etc., are stated in writing, signed by the persons, to the commissioner of mines, warden, or Government officer.

(c) Section 10 made it legal to locate lands held by others where the boundaries of a claim were not maintained in proper order.

(*d*) Section 18 (1) permits the holding of a group of contiguous claims by maintaining the outside boundaries only in good order.

(*e*) Section 20 specifies that if a location be made and on application being made for a claim license the fees due are not paid for the claim, the location shall ipso facto become null and void and the land be open to location by anyone.

(*f*) Section 21, which corresponds to section 22 of the 1896 regulations, has done away with the necessity for verifying all claims, and thereby reduced the labors of the district officers greatly.

(*g*) Section 29 enacts that all gold made during prospection without locating shall remain the property of the Crown.

(*h*) Section 29 (5) enacts that if after advertisement an applicant does not pay the fees due for a claim license, and the claim is thereafter put up for sale but not sold, the claim shall be declared forfeited, and the land included therein shall become open to location by anyone.

The license at present issued contains a proviso that it is given "in accordance with the description of the claim given by the locator thereof and without prejudice to the rights of any other persons in respect of the same land, and the locator takes the same subject to the condition that the location is on Crown land which can legally be located under the mining laws."

(*i*) Section 34 (2) confers a useful power on the commissioner or warden to detain gold obtained from any claim for which claim-license fees have not been paid. This has been regularly put into force since its enactment and has resulted in the collection of a large amount of fees.

(*j*) Section 35 reduced royalty from 90 to 70 cents per ounce of gold, and provided that any claim-license fees paid by anyone on any claim during the year should be set off pro tanto against royalty payable on gold from the claim. This proviso was enacted to insure the working of claims held under license and to prevent claims being held by individuals in numbers and unworked.

(*k*) Regulations 37-42 of 1896 were abolished and amalgamation of claims done away with.

(*l*) Section 38 (2), vesting in the governor the power to direct the commissioner not to record and indorse a transfer, has taken the place of No. 44 of the old law, but does not work so satisfactorily where cases of fraud occur.

(*m*) A useful innovation has been introduced under 38 (3) whereby transferees have to furnish registered addresses.

(*n*) Section 40 provides for the prevalent custom of subletting mining property and notification to the department of mines by the lessor of the names of his lessees, who are held responsible with the owner of the claim for the due observance of the mining laws.

(*o*) Regulation No. 52 of 1896 has been omitted in the 1899 regulations.

(*p*) Section 61. The cost for survey of a claim is now \$2 as against \$10 previously.

(*q*) Jumping of claims, sections 62 and 63. No change was made in this law, but it is not quite clear what is to be the procedure after a jumping dispute is settled, whether the old-claim license is to be revoked and a new one issued to the successful "jumper," or whether he is to locate after decision of the warden or Government officer.

(*r*) Section 97 fills a requirement left out in the old law, and makes it compulsory on an employer to provide means of conveyance to the place where he has engaged for any time-expired laborer, and in the meantime while he continues on the claim shall supply rations to him.

(*s*) Section 96 makes it obligatory to deliver the gold on which royalty has been paid to the holder of the royalty receipt, unless ordered otherwise by a court of competent jurisdiction.

(*t*) Section 97 authorizes the detention of gold obtained from land not located or for working which the fee payable has not been paid.

(*u*) Section 119 (2). The competency of persons to act as mining managers is by this section decided by a board of examiners appointed by the governor and under certain rules which have to be confirmed by the governor. The previous arrangement left the certification of managers in the hands of the mining inspector. The appointment of mining inspector having been abolished, the term commissioner in some cases and in others warden or Government officer has been substituted for mining inspector throughout the regulations.

(*v*) Section 144. Provision has been made in cases where a survey is necessary to decide a dispute for the officer deciding the matter to state on whom the expenses of the survey shall fall.

(*w*) Section 166 allows the governor to exercise his prerogative of ordering the repayment of the value of any gold seized, forfeited, and sold.

(5) These regulations, by doing away with the verification of claims, have enabled the Department to issue a large number of licenses for claims which it was found impossible to verify owing to the limited time at the disposal of the officers and the often willful obstruction put in their way by the locators of the claims themselves who were unwilling to pay the fee of \$10 for each claim which became due on verification of their claims. A glance at Appendix 15 will show that there were nearly twice as many licenses issued between the coming into force of the new regulations and March 31, 1900 (a period of barely nine months), as there were for a period of two years and eight months from November, 1896, to July, 1900.

(6) Frequent complaints were made regarding the absconding of laborers, but I see no help for this trouble until the system of giving the men advances on their wages is done away with.

STATEMENT SHOWING THE AMOUNT OF GOLD OBTAINED IN THE COLONY DURING THE YEARS 1884 TO 1900.

Year.	Gold.			Year.	Gold.		
	Ozs.	dwt.	grs.		Ozs.	dwt.	grs.
1884	250	0	0	1892-93.....	134,124	7	23
1885	939	0	0	1893-94.....	138,527	16	14
1886	6,518	1	12	1894-95.....	132,994	15	20
1887	10,986	14	0	1895-96.....	121,285	5	7
1888-89	20,216	1	8	1896-97.....	127,479	8	4
1889-90	32,332	16	5	1897-98.....	121,490	15	20
1890-91	66,864	4	21	1898-99.....	113,114	3	6
1891-92	110,555	12	5	1899-1900.....	112,789	10	20

COMPARATIVE STATEMENT OF GOLD OBTAINED FROM THE BELOW-MENTIONED DISTRICTS DURING THE FINANCIAL YEARS 1898-99 AND 1899-1900.

District.	1898-99.			1899-1900.		
	Ozs.	dwt.	grs.	Ozs.	dwt.	grs.
Barima.....	14,672	14	2	16,388	16	12
Barama	6,938	1	13	8,025	8	8
Cuyuni.....	23,342	10	9	21,919	10	18
Groete Creek.....	1,456	8	15	1,416	19	12
Puruni.....	10,592	8	0	13,862	17	0
Mazaruni	2,572	4	9	1,947	16	18
Essequibo.....	22,586	7	13	19,386	12	20
Potaro	30,921	11	18	29,764	12	5
Demerara	31	16	23	46	16	23
Total.....	113,114	3	6	112,789	10	20

STATEMENT OF GOLD OBTAINED FROM QUARTZ MINES, 1899-1900.

Origin.	Amount.		
	Ozs.	dwt.	grs.
Winter's Gold Mine	^a 857	18	19
Gold Quartz Syndicate	11	3	13
Total	869	2	8

^a The greater portion of this gold was obtained from alluvial washing on this property.

BRITISH GUIANA.

[Court of Policy. Ordinance No. 3 of 1901. An ordinance to amend the mining ordinance, 1887. 20th March, 1901. I assent: Walter J. Sendall, governor.]

Be it enacted by the governor of British Guiana, with the advice and consent of the court of policy thereof, as follows:
1. This ordinance may be cited as the mining ordinance, 1887, amendment ordinance, 1901.

2. The mining ordinance, 1887 (hereinafter referred to as the principal ordinance), and this ordinance shall be construed and remain in operation as one ordinance.

3. The following definition shall be deemed added at the end of section 2 of the principal ordinance :

“Valuable mineral” means any mineral containing gold or silver or both together with some other metal in such proportions that the gold or silver or both combined obtainable from such mineral is or are of greater value than the cost of separating the gold or silver or both from the baser constituents without any expenditure for rendering these latter constituents of commercial value.

4. (1) In any case in which owing to the amount of capital to be invested or the works to be undertaken by any person who desires to obtain a concession under the principal ordinance it appears expedient to the governor in council to do so the governor in council may with the approval of the secretary of state permit such person to temporarily occupy and test the value of any unoccupied Crown lands without a concession in respect thereof being first granted, subject nevertheless to such terms and conditions as to the governor in council may seem meet.

(2) The governor in council may, in special cases and with the approval of the secretary of state, give to any such person the exclusive right of occupation and exploration, as provided in subsection (1) hereof, within a given area.

5. In any case in which a concession is granted under the principal ordinance in respect of unoccupied Crown lands it shall be lawful for the governor to make an absolute grant therewith of the Crown lands to which such concession relates without requiring the provisions of the Crown lands ordinance, 1887, and the Crown lands regulations for the time being in force to be complied with: *Provided*, That no grant of the nature set forth in this section shall be made either under this section or under any other form of procedure without the approval of the secretary of state.

6. (1) The owner of any private lands shall hold and enjoy all metals other than gold and silver therein or thereon, and may search and mine for, and when found take and appropriate the same to his own use without previously obtaining any concession or license under the principal ordinance.

(2) The owner of any private lands shall also be entitled to take and appropriate to his own use any metal other than gold or silver contained in any valuable mineral in or on his lands, and which has been separated from such gold or silver by the holder of any such concession or license as foresaid, unless such holder purchases such metal from the owner of the land at such price as may be agreed on, or (in default of any such agreement being arrived at) as may be stated in writing by the commissioner of mines to be the net value of the metal after paying the cost of winning the same, no deduction from such cost being made on account of gold or silver, or both, having been obtained along with such metal.

(3) The owner of any private lands may, without previously obtaining any concession or license under the principal ordinance, search and mine for and when found take and appropriate to his own use any mineral therein or thereon containing gold or silver or both, together with some other metal in such proportions that the gold or silver or both combined obtainable from such mineral is or are not of greater value than the cost of obtaining the same alone therefrom: *Provided always*, That in any such case such owner shall, if any gold or silver or both is or are extracted from such mineral, comply with the mining regulations for the time being in force as to keeping a record of gold and silver obtained and as to the removal thereof and the payment of royalty thereon.

(4) Nothing in this section shall authorize the owner of any private lands to search and mine for or when found to take and appropriate to his own use any valuable mineral in or on his lands without previously obtaining such concession or license aforesaid.

(5) Nothing in this section shall give the owner of private lands any right to any precious stones therein or thereon.

7. The following words shall be deemed added at the end of the proviso marked (1) in section 3 of the principal ordinance: “except with the approval of the secretary of state.”

8. It shall be lawful for the governor in the name of His Majesty to issue a concession to any person or body corporate to occupy any river or creek or portion thereof, and there to dredge for and, if and when found, to take and appropriate to the use of such person or body corporate all gold, silver, and valuable minerals, including precious stones: *Provided*, That every such license shall be subject to such special regulations as may from time to time be passed by the governor and court of policy, and to any conditions contained in such concession. Any dredging concession issued before the commencement of this ordinance shall have effect as if issued under this section.

9. Notwithstanding anything in the principal ordinance contained, it shall be lawful for the governor, in the name of His Majesty and with the approval of the secretary of state, to issue a general concession to any person or body corporate, subject to regulations as to royalty, entitling such person or body corporate to the soil and to all minerals, including precious stones, found therein.

10. It shall be lawful for the governor to forfeit any grant or concession on breach of any regulations or conditions relating thereto.

DUTCH WEST INDIES.

PRODUCTION AND EXPORTS OF GOLD.

[From Jaareijfers Voorhet Koninkrijk der Nederlanden Kolonien, 1899, pp. 49-130.]

Year.	Production.		Exports.		
	Quantity.	Value.	Quantity to Netherlands.	Total.	Value.
	<i>Grams.</i>	<i>Florins.</i>	<i>Grams.</i>	<i>Grams.</i>	<i>Florins.</i>
1890.....	814,352	1,115,662	852,643	952,023	1,304,274
1891.....	1,236,919	1,704,579	709,014	820,983	1,124,746
1892.....	810,713	1,088,980	817,756	1,678,966	1,478,163
1893.....	867,644	1,188,672	833,118	1,159,675	1,588,755
1894.....	776,634	1,063,989	884,616	1,181,601	1,618,793
1895.....	748,539	1,025,498	736,409	954,294	1,307,383
1896.....	846,366	1,159,522	698,478	874,897	1,198,600
1897.....	903,124	1,237,280	586,036	859,905	1,178,070
1898.....	864,990	1,185,037	729,845	829,639	1,136,606
1899.....	893,197	1,223,680	823,831	872,373	1,195,151
Total, 1876-1899 ^a					24,204,207

^a Since the beginning of the industry (cf. Algemeen Verslag van het Munt-College, 1899, p. 28).

ITALY.

According to Italian official reports quoted below, the gold production of Italy in 1899 and 1900 amounted to 113.350 and 53 kilograms, respectively. The average values per kilogram are above the coining value adopted by the Latin Union. The gold must, therefore, be assumed to be fine.

The silver product of domestic mines was, according to the same source, 25,494 kilograms in 1899, and 23,374 kilograms in 1900. The estimated value per kilogram was 107 francs in 1899 and 107.82 francs in 1900, which corresponds to 63 cents and 64 cents per ounce, respectively, and must, therefore, represent fine silver.

The quantities and values of the gold and silver products are stated in the following table:

PRODUCTION FOR 1899 AND 1900.

Year.	Fine gold.		Value.	Fine silver.		United States coining value.
	<i>Kilograms.</i>	<i>Ounces.</i>		<i>Kilograms.</i>	<i>Ounces.</i>	
1899	113	3,633	\$75,100	25,494	819,481	\$1,059,531
1900	53	1,704	35,224	23,374	751,335	971,423

PRODUCTION OF THE MINES, 1900. ^a

Description.	Quantity.	Total value.	Value per ton.
	<i>Tons.</i>	<i>Lire.</i>	<i>Lire.</i>
Silver ore.....	584	398,870	683.00
Gold ore.....	5,840	266,284	45.60

PRODUCTION OF THE REFINERIES.^a

Metal.	Quantity.	Total value.	Value per kilogram.
	<i>Kilograms.</i>	<i>Lire.</i>	<i>Lire.</i>
Gold.....	57	199,933	3,477.09
Silver.....	31,168	3,360,497	107.82

^a From the Report of the Inspector of Mines, August, 1901; *Revista del Servizio Minerario* nel 1900, pp. xxv, xxx, xxxv.

The gold, with the exception of 4 kilograms obtained at the refinery of Perbusola (province of Genoa), all comes from domestic ores.

Silver was recovered from both domestic and foreign ores, viz, 23,374 kilograms from domestic ores and 7,794 from foreign ores.

The following information is compiled from *Revista del Servizio Minerario* for 1899, published by the Italian ministry of agriculture, industry, and commerce. There were in 1899 16 mines in operation producing gold ore, with a total product of 11,859 tons, valued at 457,080 lire, and 7 mines producing silver ore, with a total product of 540 tons, valued at 582,262 lire (p. xxv).

There were 9 refineries operating on domestic gold ores and both domestic and imported silver and silver-lead ores. Moreover, gold to the amount of 16.5 kilograms, valued at 56,100 lire, was obtained as a by-product at the chemical factory of L. Vogel Company, at Bovisa, in the Milan district, by treating the residue of pyrites, which had been operated upon in the manufacture of sulphuric acid. The total production of the refineries is shown in the following table:

Description.	Quantity.*	Value.	
		Per kilogram.	Total.
	<i>Kilograms.</i>	<i>Lire.</i>	<i>Lire.</i>
Gold, crude.....	113,350	3,488.97	395,475
Silver, crude:			
From domestic ores.....	25,491		
From foreign ores.....	8,150		
In all.....	33,641	107.00	3,600,108

(See pp. xxx, xxxv, and exxxiii.)

The total imports of lead ore and argentiferous lead ore amounted to 7,476 tons, coming from Asiatic Turkey, Algiers, and Spain. The yield of metal from foreign ores amounted to 8,150 kilograms silver and 4,906 tons of lead. The exports of lead ore and silver-lead ores amounted to 3,129 tons and went to Holland, France, and Belgium. It does not appear whether domestic ores alone were exported, or the export figures likewise embraced foreign ores reexported (p. lii).

The following table presents a comparative statement of the production, imports, and exports of gold and silver bullion:

Description.	Production.	Imports.	Exports.
	<i>Kilograms.</i>	<i>Kilograms.</i>	<i>Kilograms.</i>
Gold, crude.....	113	326	1,162
Silver, crude.....	33,641	1,782	32,432

Gold was imported from Germany and exported to Switzerland and France; silver was imported from France and Germany and exported to the same countries and Switzerland (p. liv).

Gold and silver products of Italian mines for a series of years are given in the following tables:

SILVER PRODUCTION.

Year.	Number of active mines.	Silver ore.	
		Quantity.	Value.
		<i>Tons.</i>	<i>Lire.</i>
1871.....	3	15	50,889
1872.....	3	15	50,889
1873.....	3	137	312,552
1874.....	3	266	774,486
1875.....	3	394	905,432
1876.....	3	249	633,232
1877.....	4	661	971,756
1878.....	4	1,041	1,359,571
1879.....	4	1,409	1,595,608
1880.....	4	1,801	2,229,159
1881.....	4	1,444	2,238,951
1882.....	6	1,449	1,739,895
1883.....	4	1,510	1,673,975
1884.....	4	1,626	1,867,331
1885.....	4	1,485	1,962,390
1886.....	7	1,639	1,441,400
1887.....	9	1,892	2,173,644
1888.....	8	2,005	1,923,419
1889.....	8	1,997	1,748,663
1890.....	8	1,750	2,100,974
1891.....	10	2,006	1,973,484
1892.....	8	1,680	1,729,492
1893.....	8	1,236	1,177,973
1894.....	6	1,103	847,222
1895.....	7	870	641,366
1896.....	8	640	536,254
1897.....	7	405	428,260
1898.....	8	435	380,238
1899.....	7	540	582,262

GOLD PRODUCTION.

Year.	Number of active mines.	Gold ore.	
		Quantity.	Value.
		<i>Tons.</i>	<i>Lire.</i>
1860.....	11	5,623	251,910
1861.....	12	2,288	211,503
1862.....	14	2,030	218,428
1863.....	13	4,022	135,139
1864.....	14	10,381	235,649
1865.....	13	4,797	205,792
1866.....	10	9,190	399,765
1867.....	10	9,190	399,765
1868.....	10	9,190	399,765
1869.....	10	9,190	399,765
1870.....	10	9,190	399,765
1871.....	17	10,947	375,482
1872.....	18	8,847	328,557
1873.....	20	5,789	131,536
1874.....	18	1,788	39,157
1875.....	17	2,701	126,277
1876.....	14	6,253	213,539
1877.....	20	7,453	251,390
1878.....	21	8,804	322,080
1879.....	28	9,706	416,524
1880.....	25	11,757	598,531
1881.....	24	12,190	475,170
1882.....	27	12,202	455,990
1883.....	19	10,486	345,003
1884.....	17	15,037	446,807
1885.....	22	11,106	498,453
1886.....	12	10,759	532,651
1887.....	18	11,134	584,918
1888.....	21	10,638	488,158
1889.....	20	10,932	508,427

GOLD PRODUCTION—Continued.

Year.	Number of active mines.	Gold ore.	
		Quantity.	Value.
		<i>Tons.</i>	<i>Lire.</i>
1890.....	21	8, 296	521, 602
1891.....	20	7, 729	466, 378
1892.....	17	6, 612	473, 482
1893.....	22	7, 393	663, 733
1894.....	27	7, 748	663, 908
1895.....	18	7, 099	649, 434
1896.....	15	7, 659	853, 008
1897.....	14	10, 723	890, 048
1898.....	13	9, 549	644, 134
1899.....	16	11, 859	457, 080

In the following tables the production of gold and silver at Italian refineries is collated for a series of years, with the imports and exports:

GOLD PRODUCTION.

Year.	Crude gold.		Import.	Export.
	Quantity.	Value.		
	<i>Kilograms.</i>	<i>Lire.</i>	<i>Kilograms.</i>	<i>Kilograms.</i>
1866.....	173	474, 368		
1867.....	162	442, 227		
1868.....	163	421, 796		
1869.....	182	488, 323		
1870.....	200	537, 411		
1871.....				
1872.....				
1873.....				
1874.....				
1875.....	28	80, 118		
1876.....	109	286, 253		
1877.....	124	375, 391		
1878.....	145	437, 665	894	1, 601
1879.....	197	596, 649	2, 030	4, 560
1880.....	217	640, 326	2, 028	2, 549
1881.....	214	590, 000	1, 988	300
1882.....	218	600, 000	693	84
1883.....	180		1, 193	82
1884.....	171	464, 373	1, 662	61
1885.....	209	628, 140	2, 159	21
1886.....	195	527, 736	2, 002	146
1887.....	234	634, 924	2, 152	194
1888.....	187	506, 323	146	135
1889.....	214	569, 848	1, 536	520
1890.....	206. 359	544, 182	254	1, 219
1891.....	281	834, 199	1, 163	243
1892.....	330	1, 022, 894	1, 035	
1893.....	362. 400	1, 121, 016	1, 173	416
1894.....	349. 314	1, 260, 286	1, 609	1, 543
1895.....	279. 705	997, 262	1, 119	2, 759
1896.....	274. 669	945, 119	1, 007	2, 517
1897.....	316	1, 091, 410	807	1, 381
1898.....	187. 856	659, 090	507	1, 739
1899.....	113. 350	395, 475	326	1, 162

SILVER PRODUCTION.

Year.	Quantity.	Value.	Import.	Export.
	<i>Kilograms.</i>	<i>Lire.</i>		
1860.....	878	193, 172		
1861.....	541	118, 921		
1862.....	856	188, 242		
1863.....	701	147, 179		
1864.....	640	134, 488		
1865.....	676	141, 906		
1866.....	659	138, 345		
1867.....	1, 723	362, 211		
1868.....	3, 039	662, 051		

SILVER PRODUCTION—Continued.

Year.	Quantity.	Value.	Import.	Export.
	<i>Kilograms.</i>	<i>Lire.</i>	<i>Kilograms.</i>	<i>Kilograms.</i>
1869	2,130	468,987		
1870	2,033	427,256		
1871	2,565	538,752		
1872	2,557	536,715		
1873	2,822	592,195		
1874	2,818	592,428		
1875	3,117	623,645		
1876	3,314	629,198		
1877	4,333	866,381		
1878	7,335	1,451,814	17,869	119,645
1879	21,122	4,226,515	24,566	1,114
1880	24,035	4,328,464	3,465	3,433
1881	24,018	4,323,240	5,641	1,583
1882	24,128	4,343,040	6,165	11,637
1883	30,128	5,423,040	7,885	33,098
1884	31,191	5,770,335	6,865	29,845
1885	33,346	4,670,280	13,571	27,451
1886	33,839	5,414,240	25,903	45,520
1887	33,387	5,500,000	29,971	20,388
1888	34,891	5,491,270	1,129	3,180
1889	33,505	5,025,750	5,416	17,116
1890	34,248	5,822,160	254	1,219
1891	37,600	6,016,000	1,187	22,820
1892	43,000	6,407,000	1,146	73,390
1893	40,095	5,653,395	1,123	51,856
1894	58,626	6,448,860	3,529	134,305
1895	44,188.902	5,037,299	2,845	37,013
1896	38,075.263	4,411,138	2,291	26,854
1897	45,313	4,588,352	2,434	50,503
1898	43,437.426	4,470,786	991	68,607
1899	33,644.566	3,600,108	1,782	32,432

JAPAN.

United States Minister Buck reports that he is unable to give any production figures for 1899 or 1900.

The report of the director of the French mint for 1901 contains, on page 275, a product of 2,342 kilograms of gold, valued at 2,215,711 yen, and 56,317 kilograms of silver, valued at 2,151,841 yen, for 1889.

This gives a value to the gold product of \$1,104,310, representing 53,421 ounces, or 1,662 kilograms fine, and a commercial value to the silver product of \$1,072,478, representing, at the average price of silver for 1899 (\$0.60 per ounce fine), 1,787,463 ounces fine, at a coining value of \$2,311,063, corresponding to 55,608 kilograms fine.

The production for 1900 is assumed to have been the same as for 1899.

The preliminary figures for 1898, given in last year's report, are corrected in accordance with the final results contained in the latest annual *Résumé Statistique de l'Empire du Japon*, published in 1901, viz, gold, 37,336 ounces; silver, 1,946,648 ounces.

Les Mines du Japon, an official publication prepared by the Japanese Government for the Paris Exposition of 1900, contains the following data on the production of gold and silver in Japan from 1892 to 1897 (pp. xii, xiii):

Year.	Gold.		Silver.	
	Quantity.	Value.	Quantity.	Value.
	<i>Grams.</i>	<i>Yen.</i>	<i>Grams.</i>	<i>Yen.</i>
1892	702,274	469,380	60,388,820	2,319,810
1893	738,241	611,306	69,433,402	2,738,144
1894	787,628	751,181	72,216,267	2,851,522
1895	898,650	971,032	72,453,173	2,865,741
1896	964,357	1,062,133	64,498,744	2,544,708
1897	1,063,158	1,198,472	55,650,061	1,906,267

It appears upon computation that the estimated value per kilogram of gold as well as of silver varies from year to year. The quantities evidently represent crude gold and silver.

KOREA.

United States Minister Allen reports, regarding the production of gold for 1900, as follows:

Owing to the absence of statistics, the production of gold in Korea is unknown, although the amount is considerable. Declared exports of gold from Korean ports in 1900 amounted to 3,633,050 yens (\$1,816,525), against 2,933,232 yens in 1899. A conservative estimate gives an almost equal amount for the undeclared export. The gold used for domestic purposes and in the arts, regarding which there are no statistics, must also be taken into account. The annual production of gold at present in Korea may be considered as between \$4,000,000 and \$5,000,000.

It would be impossible at this date to compare the Korean export figures with the import figures of the countries importing from Korea, inasmuch as most of the reports for 1900 are still in preparation.

The conjecture of our minister is, in all probability, substantially correct; that for last year was corroborated by another observer, who expressed the same view in *L'Economiste Européen* (February 23, 1900).

In the absence of direct data on the subject, the gold product of Korea is taken at \$4,500,000, upon the authority of our minister.

This corresponds to 217,687 ounces, or 6,771 kilograms, fine.

MEXICO.

The Mexican Government publishes no official statistics of the production of gold and silver. It is estimated by adding the respective values of declared exports and of the coinage for the year, with an additional allowance for industrial consumption. Of these elements the amount of exports, by far the largest, is incapable of exact ascertainment, owing to the fact that a considerable proportion of Mexican gold and silver is exported in various stages of crudeness.

The following table of exports of gold and silver for the calendar year 1900 is compiled from the *Estadística Fiscal*, of Mexico:

EXPORTATION OF GOLD AND SILVER DURING THE CALENDAR YEAR 1900.

GOLD.

Description.	Declared value.
	<i>Pesos.</i>
Gold ore.....	306,395.13
Mexican gold coin.....	151,873.00
Foreign gold coin.....	40,553.00
Gold bullion.....	7,435,867.08
Gold cyanides.....	128,677.49
Gold sulphides.....	177,194.71
Total.....	8,240,560.41

EXPORTATION OF GOLD AND SILVER DURING THE CALENDAR YEAR 1900—Continued.

SILVER.

Description.	Declared value.
	<i>Pesos.</i>
Silver ore.....	12,495,525.12
Mexican silver coin.....	22,239,952.00
Foreign silver coin.....	439,704.02
Silver bullion:	
(a) In bars.....	8,531,726.27
(b) In crude lead.....	27,357,824.00
(c) Alloyed with copper.....	5,579,206.61
Silver cyanides.....	67,608.98
Silver sulphides.....	1,893,647.43
Silver in foundry grease.....	87,884.68
Total.....	78,693,079.11

The value of the gold exported is considered at the rate of \$675.416 per kilogram, and of the silver at \$40.915, conforming to the regulation relative thereto of the date of June 26, 1895.
The average value given the Mexican peso in New York during the calendar year 1900 was \$0.4854½.

Deducting the items “domestic” and “foreign” coins from the above table, and adding the coinage of the year, we have the following:

Item.	Coining value.	
	Gold.	Silver.
	<i>Pesos.</i>	<i>Pesos.</i>
Exports.....	8,048,134	56,013,423
Coinage.....	568,825	17,097,050
Total.....	8,616,959	73,110,473

Mexico uses some bullion in the industrial arts; how much, is not known.

The value of the ore, bullion, etc., imported into the United States during 1900 was as follows:

Item.	Coining value.	
	Gold.	Silver.
Bullion deposited at mints.....	\$2,202,522	\$1,429,217
Bullion and ore refined at private refineries.....	6,172,320	53,417,850
Total.....	8,374,842	54,847,067

The total gold bullion and ore reported as exported by Mexico was \$8,048,134, while the above table shows that the United States received \$8,374,842, which exceeds their export figures by \$326,708, and makes no allowance for exports to other countries.

As the United States received from Mexico gold bullion and ore to the value of \$8,374,842 during the year, and the coinage of Mexico was valued at \$568,825—a total value of \$8,943,667—it is reasonable to assume that the gold product of Mexico for 1900 was \$9,000,000, corresponding to 435,375 ounces, or 13,542 kilograms, fine.

The Mexican silver coining rate is 40.915 pesos per kilogram, which gives for the total exports and coinage of silver a fine weight of 1,786,887 kilograms, representing a coining value in United States money of \$74,263,024, corresponding to 57,437,808 ounces, fine.

MINES AND MINING.

[Compiled by the Bureau of American Republics.]

During the year 1898-99, according to the Boletín de Estadística Fiscal, the number of existing titles to mining properties paying taxes, in compliance with the law of June 6, 1892, and other regulations, amounted to 8,350, covering 72,304 hectares.

The class of minerals and number of claims were:

Minerals.	Properties.	Hectares.
Gold	872	8,666
Gold and silver	1,932	15,763
Gold, silver, and lead	40	307
Silver	4,011	33,135
Silver and copper	192	1,637
Silver and lead	1,162	10,848
Gold and copper	69	857
Gold, silver, and copper	55	896
Silver, copper, and lead	12	147
Silver and manganese	3	35
Silver and mercury	2	13
Total	8,350	72,304

Near the city of Chihuahua is situated the celebrated Santa Eulalia mine, one of the oldest in the country, the products of which have left a monument in the very handsome parish church of San Francisco, erected in the city between the years 1717 and 1789 with the proceeds of a tax of 1 real (12½ cents) on each half pound of silver got from the mine. The total sum thus secured is stated to be \$800,000.

During the early part of the year 1897, at the properties of the Gold Hill Mining Company, in the southwestern part of Chihuahua, the result of an experimental run of 100 tons of tailings from the surface ore of the Rosario mine was a 30-ounce bar of gold. So primitive were the methods employed by the original workers of the greater part of the Mexican mines that the Indians often make a fair living by working over the tailings.

Sonora is one of the richest as well as most important mining centers. It is noted for its high-class metals, among which are gold, silver, mercury, and iron. Here abound the soft or lead ores, which are so easily worked and aid so materially in smelting. Native silver is found in these districts in considerable quantities.

Sonora has lately been turning out plenty of gold, and the output will be largely increased since the Yaqui Reservation has been thrown open. Rich placers are known to exist there, and it is expected that the influx of prospectors will be great in the near future. Over 200 prospectors went into the Yaqui country in August, 1897, and it is stated that an Arizona miner came out recently with \$80,000, the product of the work of three men during three months. Of the six millions of gold exported from Mexico during the year 1896, three and a quarter millions were furnished by Sonora.

Zacatecas is the great silver-producing State. It is estimated that in the last three centuries its many mines, which were first worked by the Spaniards in 1540, but which had previously been worked in a rude way by the Indians, have yielded over a thousand million of dollars.

Guerrero has always been considered as one of the richest mineral sections of America. Prospectors heretofore have been compelled to abandon rich discoveries on account of a lack of transportation facilities and scarcity of labor. The construction of the Mexico, Cuernavaca and Pacific Railway has commenced to open up this wonderful country, with the result that no less than three large American companies have sent experts to investigate the marvelous wealth of this belt, which is comparatively unknown. Many natives in the state named make a living by washing out placer gold in the crudest possible manner.

Experts announce that there is an abundance of gold in this portion of the country, and that the only need is the presence of intelligent prospectors to find it. The gold runs from 10 to 12½ ounces to the ton.

The State of Oaxaca has long been recognized to be rich in gold, and much work has been done by the arrastra system, by which a good deal of the metal was lost in the tailings. There is the best authority for the statement that some dumps there contain thousands of tons which will assay as high as an ounce to the ton.

Guanajuato is another far-famed silver-producing State, and has been and still is the center of great exploitation. The district bearing the name of the State was dis-

covered in 1548, and has been worked almost continuously ever since that date, the output of its mines reaching fabulous figures. Native gold has been discovered in this district.

Pachuca, with its rich cluster of mines, lies on a plain about 60 miles from the City of Mexico, and is one of the oldest mining centers in the country, having been worked for more than three and one-half centuries. The district within which it lies now has a population of 98,269, a large proportion of which is Indian miners. It was here that the patio process of amalgamation was discovered by the celebrated Mexican miner, Bartolomé de Medina, in 1557. The very hacienda de beneficio or reduction works where this discovery was made are still to be seen in the town.

Sulphate of silver is the prevailing metal, although native silver mixed with ore is found in some of the mines of this district. Most of these mines, as well as those in other States, are still operated in the primitive Mexican fashion. The metal is brought up in rawhide sacks by means of ropes made of the fiber of the maguey wound about a large malacate (horse or mule windlass), and the peons or laborers carry pieces of ore weighing sometimes between 100 and 200 pounds on their backs from "headings" of the levels to the main shaft. Some foreigners are employed in the mines of Pachuca and elsewhere at good wages, but they generally are superintendents, engineers, bosses, etc.

The most interesting fact in connection with the mining industry of Mexico is the recent increase in her gold output. In 1893 the value of the gold produced was only $3\frac{3}{4}$ per cent of the silver. In 1894 it rose to about 14 per cent; in 1895 it increased from 14,896 pounds to 18,539 pounds in fine gold.

The exports of gold bullion from Mexico since 1888-89, according to Mexican official figures, have been as follows:

Year.	Value (Mexican silver).	Year.	Value (Mexican silver).
1888-89	\$349,506	1894-95.....	\$4,139,645
1889-90	457,608	1895-96.....	5,246,418
1890-91	612,618	1896-97.....	5,858,366
1891-92	751,407	1897-98.....	6,364,308
1892-93	357,887	1898-99.....	7,347,760
1893-94	155,954		

The exports of silver bullion since 1888-89 are as follows:

Year.	Value (Mexican silver).	Year.	Value (Mexican silver).
1888-89	\$6,629,260	1894-95.....	\$18,803,867
1889-90	7,259,956	1895-96.....	26,345,160
1890-91	6,751,217	1896-97.....	32,137,257
1891-92	6,559,668	1897-98.....	35,721,275
1892-93	5,148,202	1898-99.....	40,429,954
1893-94	3,130,823		

The exports of metals, exclusive of gold and silver bullion, but including gold and silver coin, since 1894-95, are as follows in Mexican pesos:

Minerals.	1894-95.	1895-96.	1896-97.	1897-98.	1898-99.
Gold ores	\$59,660	\$160,555	\$349,082	\$389,393	\$992,929
Silver ores.....	10,935,353	10,885,479	10,680,732	11,137,996	9,854,850
Mexican gold coin	164,113	169,794	93,632	116,428	212,422
Mexican silver coin	17,077,119	20,377,663	14,578,958	18,214,989	14,116,935

There are five processes for the reduction of ore at present in use in Mexico—the patio, tonel, lixiviation, fuego, and pan.

The patio process, invented as before stated, by Bartolomé de Medina, consists of amalgamation with quicksilver. This system of treating ore is as follows:

The ore is brought from the mine in large pieces and carried to a covered box, where it is pounded to pieces by immense wooden crushers, provided at the end with heavy iron pestles, and working on arms connected with an axle, operated by horse-

power. The iron pestles reduce the ore to pieces, which fall upon a sieve made of hide, the smaller fragments passing through it while the larger are placed back in the box to be crushed again. There are generally several of these crushers in a straight line, working alternately. After the ore has been crushed in the mortars (*morteros*) it passes to the mill (*tahones*), which consists of a round vat placed on a level with the floor. Here the ore is ground up into fine dust by means of three heavy and hard granite stones, oblong in shape and connected with a revolving shaft operated by horsepower.

By the gradual addition of water during this process of pulverization a muddy mass is formed, which at the proper time is thrown out into the patio (yard), which has a floor made of hard cement or stone, where the mud is treated by the addition of quicksilver and strong brine, called *caldo*. It is thus left in the open air, exposed to the heat of the sun for some twenty or thirty days, being stirred every day by men and horses tramping over it until the quicksilver and the salt are well incorporated to the ore. This substance is called *torta de lama* (cake of mud), and when the process of mixing is completed, the mud is carried to the *lavadero* (washing place) and placed in vats where it is washed, leaving in the vats what is called *plata piña* (amalgamated silver), containing quicksilver. This amalgam is then placed into stout canvas bags and submitted to a heavy pressure to extract the mercury, and when this operation is completed it is placed in the oven, where the silver is purified.

An additional process connected with this system in the reduction of certain kinds of ores is employed after the mineral has been exposed to the sun in the patio, or yard, when it is transferred to the *planillo*, which is an inclined plane in the open air, having a solid stone floor some 60 feet long and 20 feet wide. The workmen are engaged all along this inclined plane in throwing small quantities of water on the *lama*, so that the mud runs off to a ditch while the silver remains at the foot of the plane. This method requires skill, as the water must be added gradually. The silver and the remaining muddy mass is carried to a large iron boiler where it is heated and stirred until the evaporation of the liquid is accomplished. At the proper stage of this operation the remaining substance is taken to the amalgamating room, where the quicksilver is added, which unites with the silver. The mass resulting is then washed again, only the amalgam of silver and mercury remaining, which is further purified in a furnace and the silver run into molds.

In the method of lixiviation which is adopted in several of the States the rock is crushed dry and passed through screens of twenty to thirty meshes to the inch. It is then roasted in reverberatory furnaces with salt. The roasted ore is then subjected to the water process, being kept in large tanks or tubs, constantly covered and run over by clear water during a number of hours, after which the water is drawn off and a cold solution of hyposulphate of soda is made to pass through the ore until it is ascertained that the solution carries no more silver. The silver carried by the hyposulphate solution is precipitated by the addition to that solution of another solution of quicklime and sulphur, known as calcium sulphide, which is made by boiling lime and sulphur. After the precipitation and the running off of the precipitating liquid the silver appears as a sulphide, is put into canvas filters, dried, roasted in reverberatory furnaces to carry off the sulphur, and then melted into bars. If the operation is carefully performed, the bullion resulting will be from 900 to 1,000 fine. The solution is pumped back into the tanks to be used again.

There are several kinds of silver ore taken from the mines. Some of the principal varieties are *plata blanca* (white silver), which is the rarest and best; *plata verde* (green silver), united with copper; *bronces* (bronzes), united with iron; *plomosos* (lead), united with lead, a very soft ore; *caliches* (chalk), united with a chalky substance very greatly resembling the common white limestone, but which is rich in silver and easily worked. Previous to the passage of the tariff bill of 1890, generally known as the McKinley bill, and the succeeding tariff bills, silver-bearing lead ore was brought from Mexico to the United States for reduction. These bills put a heavy duty on such ores, and have caused companies to form in the latter country to establish smelting works in different parts of Mexico. Millions of dollars have been invested by American capitalists in this industry.

Wages for miners range all the way from 37½ cents to \$1.50 per day, the workmen being mostly peones. Superintendents, ore treaters, etc., are generally Americans, Swedes, or Germans.

MINTS, CURRENCY, BANKS, AND BANKING.

Since the enactment of the law of June 6, 1887, the production of gold and silver has greatly increased in the Republic, and it is due to this law that the latter metal has attained its present enormous output. The main objects of the law in reference were: The reduction of the cost of metal production; to relieve the mining industry as much

as possible of the onerous taxes and obstacles which retarded its free development; to lower the cost of the principal raw materials required in the industry, and also to attract capital. Further legislation on June 6, 1892, gave a new impetus to mine production, the output of silver from 1886 to 1891 being valued at \$199,208,204, while from 1891 to 1896 it aggregated \$267,122,418. By the law of June 4, 1894, the executive was authorized to grant concessions under certain conditions to those engaged in the exploitation of gold mines, this industry having increased its production from \$920,702 in 1890-91 to \$4,744,542 in 1894-95, and to \$6,054,078 in 1895-96. This calculation is made on the basis of \$20 silver per ounce of gold, which is the standard used in the Mexican statistical tables. It is claimed that these figures do not cover the true production of the gold districts, as almost all the exports of this metal are shipped clandestinely.

Mints were established in Mexico in 1537, the custom being sometimes followed of renting them to private individuals, who collected a mintage charge of nearly 4½ per cent upon the amount of bullion coined. Until within six years ago there were 13 mints in the Republic, but as increased facilities of transportation have reduced the difficulties attendant upon the carriage of the bullion from mine to mint, this number has been decreased to 4, 1 being in the City of Mexico, 1 in Guanajuato, 1 in Zacatecas, and 1 in Culiacan. Besides these mints there are Federal assay offices situated at Aguascalientes, Alamos, Chihuahua, Durango, El Paso (Tex.), Guadalajara, Hermosillo, Monterey, Oaxaca, San Luis Potosi, Sierra Mojada, and Zacatecas.

The receipts of precious metals at the Federal assay offices and mints from 1889-90 to 1898-99 were as follows:

Year.	Pure silver. ^a		Pure gold. ^a	
	Kilograms.	Value.	Kilograms.	Value.
1889-90	632,935.879	\$24,814,965.28	1,464.619	\$979,059.75
1890-91	632,951.795	24,814,782.38	1,609.777	1,089,702.32
1891-92	712,572.272	28,096,084.85	2,470.897	1,657,716.98
1892-93	772,636.696	30,383,428.66	2,840.032	1,902,296.43
1893-94	886,178.076	34,845,542.68	3,381.733	2,260,865.32
1894-95	981,222.111	38,934,191.75	3,991.498	2,674,278.35
1895-96	1,314,849.340	53,797,060.63	6,289.093	4,247,759.83
1896-97	1,342,931.298	54,946,033.97	5,788.694	3,909,782.42
1897-98	1,496,969.402	61,248,503.08	5,712.426	3,858,269.06
1898-99	1,417,216.194	57,985,400.58	5,986.485	4,043,373.70

^a From 1889 to 1895 silver was quoted at \$39.109 per kilogram, and from 1895 on at \$40.915. Gold was quoted during the same periods at \$643.527 and \$675.417 per kilogram, respectively.

The exports of these metals from the mints and assay offices of the Republic during the same period were as follows:

Metal.	Kilograms.	Value.
Pure silver.....	3,910,704.135	\$160,311,249.27
Pure gold.....	29,705.125	20,064,066.03
Total.....	3,940,409.260	180,375,315.30

NETHERLANDS.

LEGATION OF THE UNITED STATES,
The Hague, January 21, 1901.

SIR: Acting on the instruction of the Department of State advising that answers to interrogatories 13, 14, 15, and 16 of the circular relating to the coinage and currency of the Netherlands and its colonies in the year 1900 be procured and forwarded at the earliest date, I have the honor to state that there is no gold and silver produced in this country, and that the answers to questions 14 and 16, relating to the production of the precious metals in the Netherlands colonies, shall be forwarded as promptly as possible.

I have the honor to be, sir, your obedient servant, STANFORD NEWEL.

HON. GEORGE E. ROBERTS,
Director of the Mint, Treasury Department, Washington, D. C.

NORWAY.

According to the Statistique des Mines et Usines en Norvege en 1896-1898, the silver production of Norway for 1898 was 4,802 kilograms, fine, of the value of \$199,571, corresponding to 154,356 ounces, fine.

United States Minister Thomas, under date of May 16, 1901, says:

At the Kongsberg Silver Works there was produced from July 1, 1899, to March 31, 1900, about 4,033 kilograms fine silver, which was sold for 290,272 crowns. At other works, as far as is known, there has not been any regular production of any importance.

If the production from July, 1899, to March, 1900 (nine months), was 4,033 kilograms, in the same ratio the production for the year would be 5,377 kilograms, which, in the absence of actual figures for the year, is taken as the estimated product.

The value of 5,377 kilograms fine is \$223,468, corresponding to 172,839 ounces fine.

The information given below was compiled at this Bureau from Norwegian official publications.

In the following tables the production of the mines, the export of silver ores, and the product of Norwegian refineries are given:

Year.	Production of the mines.			Refined product.
	Crude silver.	Silver-bearing ores.		
		Production.	Exports.	
	<i>Kilograms.</i>	<i>Metric tons.</i>	<i>Metric tons.</i>	<i>Kilos, fine.</i>
1889	3,999	1,632	348	5,350
1890	3,966	1,307	368	5,080
1891	3,200	1,274	304	4,680
1892	3,688	1,117.4	474	4,810
1893	3,890	886.5	151	4,770
1894	4,001	746	202	4,760
1895	3,530	486.4	137	5,000
1896	5,116	521.6	173	4,664
1897	5,308	637.2	119	5,372
1898	5,401	491.6	79	4,802

The values of the mining product and the refined product are given in the following table:

Year.	Mining product.	Refined product.
	<i>Crowns.</i>	<i>Crowns.</i>
1889	658,500	605,000
1890	621,000	622,600
1891	576,500	560,000
1892	490,000	484,000
1893	433,500	436,500
1894	373,500	380,000
1895	355,000	390,000
1896	400,000	377,000
1897	385,000	480,000
1898	332,000	345,000

There having been no imports of crude silver or silver ores within the period 1889-1898 the refined product represents wholly silver of domestic production. There is only one smelting and refining establishment, located at Kongsberg and belonging to the State. The operations of this refinery are stated in fuller detail for the years 1896-1898 in the following table:

Year.	Crude silver.		Silver ores.		Total fine product.
	Smelted.	Fine product.	Smelted.	Fine product.	
	<i>Kilograms.</i>	<i>Kilograms.</i>	<i>Kilograms.</i>	<i>Kilograms.</i>	
1896	5,196.035	3,128.950	325,056	1,534.950	4,662
1897	5,579.695	3,831.270	352,433	1,540.693	5,372
1898	5,401.110	3,325.600	452,340	1,476.150	4,804

The average annual product of the Kongsberg works within the preceding three quinquennial periods is given in the following table:

Annual average—	Kilograms.
1881-1885.....	6, 265
1886-1890.....	6, 077
1891-1895.....	4, 804

GOLD.

The production of gold in Norway is insignificant, as appears from the following table:

Year.	Weight.	Value.
	<i>Kilograms.</i>	<i>Crowns.</i>
1889		33, 000
1890		43, 300
1891		24, 000
1892		36, 500
1893		22, 000
1894		3, 500
1895		8, 000
1896	14. 26	35, 000
1897	1. 27	2, 500
1898	2. 86	5, 700

IMPORTS AND EXPORTS IN 1899.

No gold or silver bullion was exported in 1899. The imports for the year were as follows:

	Kilograms.	Crowns.
Gold bullion	1. 1	1, 700
Silver bullion	102. 1	8, 100

The exports of silver ore amounted to 14.160 kilograms, valued at 3,600 crowns.—(Statistique des Mines et Usines en Norvège en 1896-1898, pp. 1, 2, 6, 14-19; Statistique du Commerce de la Norvège pendant l'année 1899, pp. 26, 53, 55, 56.)

PERSIA.

LEGATION OF THE UNITED STATES OF AMERICA,
Teheran, February 6, 1901.

SIR: In reply to your circular, dated January 2, 1901, I beg to inform you, in connection with your interrogatories Nos. 13, 14, 15, and 16, that no gold or silver was produced from the mines of Persia during the year 1900. Persia at the present time has no colonial territory under her jurisdiction, consequently she has received neither gold nor silver from such a source. I may, however, add for your information that gold in small quantities is collected from certain irrigation streams in the neighborhood of this city, mixed with the alluvial deposits brought from certain slightly auriferous areas in the immediate vicinity of the locality where it is found. As the quantity produced from this source is very small, no notice is taken of it by the Government surveyors, and so it does not appear in any report on the subject.

I have the honor to be, sir, your most obedient servant,

HERBERT W. BOWEN,
Minister Resident, etc.

HON. GEORGE E. ROBERTS,
Director of the Mint, Washington, D. C.

PERU.

Mr. Neill, secretary of the legation of the United States at Lima, Peru, has forwarded this Bureau a condensed report by Prof. E. Habich, director of the Lima school of mines, in which he says that the silver production in Peru for 1898 was somewhere between 160,000 and 170,000 kilograms. This Bureau accepts the average of these amounts, i. e., 165,000 kilograms and accordingly corrects the estimated product for that year.

The 165,000 kilograms, fine, equals \$6,857,400, representing 5,303,770 ounces, fine.

The bureau of statistics at Lima estimates the gold and silver product for 1899 at 1,295 kilograms, fine, for gold, and 203,000 kilograms, fine, for silver. The estimate of Professor Habich gives only 1,250 kilograms for gold, which is the official figure for the metallic product, and evidently takes no account of the gold contents of exported ores. His estimate of the silver product falls considerably short of the official figure. On the other hand, Mr. Alejandro Garland, the noted Peruvian expert, accepts the official figures in an article reproduced in condensed form on a following page.

This Bureau accepts the figures of the Lima bureau of statistics. The gold product is accordingly valued at \$860,657, representing 41,634 ounces fine, and the silver product at \$8,436,680 (United States coining value), corresponding to 6,525,245 ounces, fine.

Mr. Dudley, United States minister at Lima, estimates the product of gold for 1900 at 1,815 kilograms, of a value of £223,000, and the product of silver at 265,700 kilograms, fine, valued at £929,500.

The value of the gold product for 1900 (£223,000) is equivalent to \$1,085,230, corresponding to 52,498 ounces, or 1,633 kilograms, fine. The value of the silver product is given at £929,500, equivalent to \$4,523,412 commercial value, which, at \$0.62 per ounce, fine, would give 7,295,825 ounces, fine, of a coining value of \$9,432,986, representing 226,973 kilograms, fine.

LEGATION OF THE UNITED STATES,
Lima, December 22, 1900.

SIR: With reference to various communications which have passed from this legation to the Peruvian chancellery regarding the gold and silver production of Peru for the year 1899, as requested by you, I have the honor to herewith inclose for your information a copy and translation of a report from Prof. E. Habich, director of the Lima school of mines, accompanied by a copy and translation of a note from Dr. Felipe de Osma, the minister for foreign affairs, which this legation has at this late date just received.

Respectfully, yours,

RICHARD R. NEILL

HON. GEORGE E. ROBERTS,
Director of the Mint, Washington, D. C.

[Translation.]

FOREIGN OFFICE, *Lima, December 21, 1900.*

MR. CHARGÉ D'AFFAIRES: In view of the note which the legation of the United States addressed to this ministry (or department), under date of August 31 last, the director of the administrative department of the department of finance asked for

information from the special school of civil and mining construction, and this establishment has transmitted the report, of which I inclose herein an exact copy.

I have the honor to reiterate to your honor the assurances of my highest esteem.
FELIPE DE OSMA.

Señor RICHARD R. NEILL,
Chargé d' Affaires of the United States of America.

[Translation.]

The DIRECTOR OF THE ADMINISTRATIVE DEPARTMENT
OF THE DEPARTMENT OF FINANCE:

In the report presented by the school to your department under date of August 13 last you will find set down with certain probability of correctness the total amount of the gold obtained in 1899. As mentioned in that respect, in view of the absence of sufficiently reliable statistics and also in consequence of the facility for all kinds of contraband operations on account of the high value of the article and the very small space it occupies, it is extremely difficult to determine the real amount of the production with the requisite exactitude. The quantities expressed in the said report indicate 1,250 kilograms as the approximate production of gold in 1899.

With regard to the value, as the legal coin of to-day in Peru is the gold "pound," equal in weight and standard to the English "pound sterling," we may consider the value of each kilogram as about £136.375, and consequently estimate, in round numbers, the value of the 1,250 kilograms as £180,719.

With respect to the production of silver, this school, in the report asked for through the foreign office by the British Government under date of November 29 last, put this down at somewhere between 160,000 to 170,000 kilograms during the year 1898. In calculating the production for 1899 a reduction must be made, owing to the stoppage of work in many mines, especially in the mining district of Cerro de Pasco, which is the most important center of production.

The probable figure which we may adopt for the production in 1899 of fine silver in bars, in sulphurets, and ores exported is somewhere about 150,000 kilograms.

As regards the commercial value in Lima of the kilogram of fine silver, it must be borne in mind that almost the whole amount is exported, consequently the price rules in accordance with the quotations received for the ounce, Troy, in London, taking into consideration the charges for freight, insurance, commission, etc.

As during 1899 the price in Lima of the mark of Peruvian silver has ruled between 8.60s. and 9s., these figures fix for the kilogram of fine silver the price of 37.50s. to 39.33s.; that is to say, about £3.75 to £3.933.

E. HABICH.

LIMA, September 26, 1900.
Correct.

A. ULLOA,
Chief Clerk of the Foreign Office.

[From Monthly Bulletin of the Bureau of American Republics, May, 1901.]

The bureau of statistics at Lima has recently published some interesting data concerning mining statistics.

In 1899 the production of bullion was as follows:

Metal.	Weight.	Value.
	<i>Kilograms.</i>	<i>Sols.</i>
Gold	1,250	1,175,000
Silver	69,044	2,678,959
Argentiferous lead	202,533	98,708

The output of ores, concentrates, and other mineral products in the Republic in 1899 was as follows:

Metal.	Weight.	Value.
	<i>Kilograms.</i>	<i>Sols.</i>
Gold	11,338	32,030
Silver	14,840,304	3,153,101
Argentiferous copper	2,621,881	1,173,876
Argentiferous lead	106,994	91,679

The Government estimates these ores to contain 1,295 kilograms of pure gold and 203,000 kilograms of pure silver. Since the adoption of the gold standard in Peru a considerable quantity of gold bullion has gone to the mints to be coined into money. All of the silver produced, however, except that employed in the arts, has been exported.

The following figures are taken from the publication of the National Mining Society of Peru:

PRODUCTION OF PERU, 1899.

[Condensed from an article by Mr. Alejandro Garland, in *Boletín de la Sociedad Nacional de Minería*, December 31, 1900, pp. 440-446.]

Description.	Weight.	Value (10 soles=£1).
	<i>Kilograms.</i>	<i>Soles.</i>
Metallic products:		
Gold bullion	1,250.000	1,175,000.00
Silver bullion	69,044.832	2,678,959.85
Argentiferous lead	202,533.000	98,708.19
Silver sulphides	203,193.060	1,736,782.58
Auriferous zinc	76.500	4,920.00
Ores:		
Gold	11,338.000	32,030.12
Silver	14,840,304.000	3,153,101.46
Argentiferous copper	2,621,881.000	1,173,876.42
Argentiferous lead	106,994.000	91,679.00

From these figures the quantities of fine gold and silver, including the fine gold and silver contents of exported ores, are estimated as follows:

	Kilograms.
Gold	1,295
Silver	203,000

EXPORTS IN 1899.

[Exclusive of coin.]

Description.	Weight.	Value.
	<i>Kilograms.</i>	<i>Soles.</i>
Metallic products:		
Gold bullion	17.143	17,189.50
Silver bullion	67,544.832	2,618,959.85
Argentiferous lead	202,533.000	98,708.19
Argentiferous sulphides	203,193.066	1,736,782.58
Auriferous zinc	76.500	4,920.00
Ores:		
Gold	11,338.000	32,030.12
Silver	14,840,303.000	3,153,101.46
Argentiferous copper	2,621,881.000	1,173,876.42
Argentiferous lead	106,994.000	91,679.38

It appears from the foregoing tables that all the ores mentioned therein were exported, as well as the argentiferous lead, silver sulphides, and auriferous zinc. Of the metallic products, all gold bullion, except a small quantity (1.38 per cent of the product of 1899), remained in the country.

Of the 1,232.857 kilograms of gold, the difference between the production and exports, according to the customs statistics, there was coined in 1899 at the national mint 296.893 kilograms, leaving a balance of 936.264 kilograms, of the value of £34,505.16, partly for consumption in the industrial arts, partly held in reserve for coinage in 1900, which far exceeded that of the year 1899, and partly exported clandestinely to evade the payment of the export duty of 3 per cent.

With the suspension of silver coinage since the adoption of the gold standard all silver bullion produced in 1899 was exported, except so much as was consumed in the industrial arts, which may be reasonably estimated at 1,500 kilograms, considering that silver coin is preferably melted for the purpose.

Thus the total production for 1899 is shown to be an estimate obtained by adding to the quantity exported an allowance for domestic consumption, amounting to 2.22 per cent of the exports.

PORTUGAL.

Our minister at Lisbon advises this Bureau that the Portuguese mint is unable to furnish information on the production of the precious metals in that country. Customs statistics record no exports of gold or silver ore. A study of import and export figures relating to gold and silver coin and bullion since 1861, made at this Bureau last year (see Report, p. 327), failed to disclose any positive indication as to the production of gold and silver. For these reasons the figures for 1898, reproduced from Mines and Quarries and La Statistique de l'Industrie Minérale, are repeated without alteration, upon the authority of those publications.

RUSSIA.

United States Ambassador Tower gives the official figures of the gold and silver production for 1900 as follows:

Gold, 1,850 poods 18 pounds 69 zolotniks 76 dolyi, to the value of 39,150,401 rubles 6 copecks. This is equivalent to 30,312 kilograms fine, or 974,537 ounces, representing \$20,145,466.

Silver, 272 poods 5 pounds 27 zolotniks 81 dolyi, to the value of 247,700 rubles 82 copecks. It is found by computation that the latter sum represents the Russian coining value of the stated quantity of fine silver. This is equivalent to 4,458 kilograms, or 143,299 ounces, fine, of a coining value of \$185,275.

TABULAR STATEMENT OF THE PRODUCTION OF THE PRECIOUS METALS IN 1899 AND 1900.

Year.	Kilograms fine.	Ounces fine.	Coining value.
Gold:			
1899.....	33,354	1,372,333	\$22,167,100
1900.....	30,312	974,537	20,145,466
Silver:			
1899.....	4,196	134,887	174,400
1900.....	4,458	143,299	185,275

THE GOLD MINES OF SIBERIA.

By CHESTER WELLS PURINGTON

[From The Engineering Magazine, September, 1901, p. 891.]

[Within very recent years only has Russia begun to attract even a fraction of the interest her wonderful engineering and industrial possibilities deserve. How keen that newly awakened interest is is proved by the remarkable attention given to Mr. Ford's series on "Engineering Opportunities in the Russian Empire," recently concluded in this magazine. Mr. Purington takes up another side of the subject and gives a startling, almost sensational, view of the enormous gold wealth in Siberia

waiting only for intelligent development. And this striking account is by a man thoroughly familiar with the field from four professional journeys.—THE EDITORS.]

Twenty-five million dollars in gold is annually produced and put in circulation by the miners who operate in the little-known regions of eastern Russia and Siberia.

To many this fact will doubtless come as more or less of a surprise. For some reason, while Africa, Australia, South America, and Alaska have received a large share of the world's attention during the past fifty years, the vast territory of central and northern Asia has remained unnoticed and unexplored.

* * * * *

In the first place let us consider what is the gold-bearing area of Siberia. Divided into five districts, the auriferous areas in Siberia are as follows:

	Square miles.
Ural district (lying partly in Siberia and partly in eastern Russia)	60,000
Yenisei district.....	280,000
Trans-Baikal district (south).....	20,000
Trans-Baikal district (north).....	160,000
Amoor district	360,000
Total gold-bearing area	880,000

As compared with these figures, the gold-bearing areas of the United States are seen in the following table:

	Square miles.
California.....	15,000
Rocky Mountain district, including Nevada and South Dakota	180,000
Appalachian district.....	10,000
Alaska districts	60,000
Total gold-bearing area	265,000

In other words, the gold-bearing area of the United States is but little over five times the area of New York State, while that of Siberia is over eighteen times as great.

* * * * *

Placer gold, or gold found in stream deposits which overlie the gold-bearing quartz veins, has been and is to-day the source of the Siberian product. From the time when the Russians first commenced to exploit the Siberian deposits, during the reign of Catherine II, there has been but little change or improvement in the mining methods.

The prevailing characteristic of the Slav, which may be described rather as conservative activity than as sloth, has caused him to adhere strenuously, one may almost say religiously, to the methods pursued by his ancestors. Placer gold was the first variety found by the early miners. In the history of all mining countries it has been the placer gold which first attracted attention. In California and Australia, however, to take two notable instances, mechanical methods of handling the gravels in which the gold occurs were an almost immediate consequent upon the finding of the deposits. To such a point of excellence was the hydraulic method of placer mining brought in California that bodies of gravel carrying but 2 cents to the cubic yard in gold were profitably handled and their values extracted.

While the Californian and Australian placer miners rapidly improved their methods of operating and increased their daily product, the Siberian made no changes. It is a most remarkable statement, but one vouched for by observers who have at different times traversed the country, that precisely the same types of gold-washing machines which were in use in Siberia before the discovery of gold in California are in use to-day in the gold mines of the Lena and Amoor rivers. Such innovations or improvements as have been made are so few in number and so insignificant in results as to be scarcely worthy of mention. A short description of the typical washing machine in use in Siberia at the present day may serve to give an idea of the very primitive methods employed.

A platform set on a staging of rough logs is erected to a height of 25 feet above the ground. The platform is 12 feet in width, and built sufficiently strong to support the weight of several small carts loaded with gravel with accompanying man and horses at the same time.

An incline with gentle grade leads from the bottom of the gravel bank which is being worked to the top of the platform. Water sufficient for washing the gravel is either led to the top of the structure from some point higher up the stream, or raised to the required level by means of a centrifugal pump, generally of small capacity. A

hopper at the end of the platform opens directly into a horizontally revolving cylindrical screen, through the holes in which the gold and fine material is allowed to pass directly on to sluice tables, while the large stones fall from the lower end of the screen into a large bin, whence they are carted away. The actual saving of the gold on sluice tables is done much in the fashion of American placer mining, although the operations are performed generally in a careless manner which allows most of the finely divided gold to escape. From the time when the gravel is dug from the bank with pick and shovel, hauled up the long incline in carts holding a quarter of a cubic yard, and dumped into the hopper, the operation involves the labor of men and horses entirely, with no mechanical assistance. The rocks and worthless gravel called "tailings" are also gotten rid of entirely by hand labor in most cases, although at some mines various forms of elevators of small capacity are used.

The result is that the Siberian placer miner expends a large share of his working cost for the hand labor involved in his operation. He never attempts to work gravels where the tenor is less than 33 cents to the cubic yard in gold. Besides this, his daily product is necessarily small. I know of no single machine of the kind described above whose capacity exceeds 500 cubic yards in twenty-four hours. One proprietor with whose operations I am familiar, in order to attain a product of \$800,000 per annum in gold, uses 2,000 men and over 500 horses. The amount of gravel handled during the year is very nearly 1,200,000 cubic yards, and the cost of his operations amounts to three-quarters of the value of the gold produced. From thirty-five to forty machines of the type above described are in use on this property, and besides these there are countless small operations conducted by peasant "tributers." The ground worked in this expensive and laborious manner is in no way different from gravel mines in the United States, where the handling and washing of the material is done entirely by means of steam excavators and conveyors.

The work done by the enormous body of men and animals quoted above would require only five American steam shovels or land dredges, with suitable machinery for washing the gravel, saving the gold, and disposing of the débris. The service of perhaps sixty men would be necessary, and engine and boiler capacity up to 600 horsepower. The entire running and administration expenses would amount to something less than 15 cents per cubic yard of material handled, as against 50 cents by the Siberian method.

Did space permit, the citation of statistics from the Siberian operations might be indefinitely prolonged; but the above figures are sufficient to show by what slow and primitive means the annual twenty-five million dollar product of Siberia is obtained. I wish to emphasize especially the fact that this is almost entirely obtained from gold-bearing gravels, or superficial deposits, and that with very few exceptions no attempts have been made to work the quartz reefs lying underneath. In most localities these have not been even looked for, and when found by accident they have rarely been tested to ascertain the amount of their auriferous contents. A few quartz mills are in operation in the Ural Mountains, which are, with one exception, antiquated in construction and extremely inefficient in operation.

Deep mining, in the American sense of the term, is almost unknown in Siberia. So far as I know, there is not a shaft in any gold-quartz mine in the country which exceeds 500 feet in depth, nor is there a tunnel 1,000 feet long. When this sort of mining activity is compared with that which has recently existed on the South African Rand deposits, or with that of the great Comstock lode, where more than 100 miles of shafts and tunnels were driven on the vein in a single year, the reasons for such startling contrast appear worthy of some investigation. That gold-bearing veins warrant extensive mining and milling operations exist in Siberia is beyond question.

During the course of examination of Siberian gold deposits, extending over a period of fifteen months, I have seen lodes in many parts of the country which, if worked, would pay large returns. An American company which has established a small gold mill in the trans-Baikal district, to the southwest of Irkutsk, reports extremely favorable results of its operations. Mr. E. D. Levat, a French mining engineer who has explored the country along the Onon River, near the Mongolian frontier, speaks highly of it as a quartz-mining country, at the same time condemning in strong terms the slovenly Siberian mills which have been installed there. In the Achinsk district of Siberia, lying to the west of the Yenisei River and about 100 miles to the south of the trans-Siberian railroad, I went with a party of four other Americans to visit the mines of a large Siberian proprietor. This gentleman, much more progressive than his neighbors, has recently installed a Krupp gold mill of modern pattern at a quartz mine which he has lately discovered. On arriving at the mine after a long "tarantass" drive, followed by a horseback journey over one of the foothills of the Altai Mountains, we looked about with no small degree of curiosity. We followed our host up the gulch to the mine workings, and, entering one of the prospect tunnels, proceeded to examine the ore.

The wall rock of the vein appeared to be full of little crystals of iron sulphide, and

on closer inspection particles of gold were visible. The finding of free gold in the rock, away from the quartz of the vein, was rather extraordinary, and it in some measure prepared us for the appearance of the quartz in the face of the drift. Here, by candlelight, on the face of quartz 8 feet in width, appeared wire-like strings and masses of native gold extending in lines more or less parallel to the walls from top to bottom of the drift, which was about 6 feet high. Such an unprecedented display warranted the opinion that here was the prize "specimen mine" of the world, or that Siberians were past masters in the art of "salting." More was to come, however. In no less than six openings on this vein, all following it from 50 to 200 feet in the mountain side, we were shown these marvellous exhibitions of free gold. Blasts of powder were put in wherever we directed. Specimens were taken from the fresh face, beaten up in mortars, and panned. In every case gold was found, often at the rate of hundreds of dollars to the ton. Salting appeared out of the question, and a subsequent examination of the vein along a course of 700 feet showed the free gold already found in the tunnels. By an exhibition of his government record books, kept by order of the mining department to accompany the consignments of gold turned in to the agents of the St. Petersburg mint, the owner proved to us that he had in four months' time taken over \$50,000 from this vein, crushing only 18 tons of ore a day.

That the deposit described above is not of an exceptional character in Siberia could be proven by the citation of numerous examples. It is sufficient to show, however, that where sensible and business-like mining operations have been undertaken they have met with success. By means of the railroad central Siberia is now much easier of access than are portions of the United States, and the rates of transportation for both passengers and merchandise are extraordinarily low. Large cities, provided with first-class hotels and possessing all the luxuries of civilized life, are numerous. The climate is remarkably healthful and enjoyable, the winters, generally thought of as unbearable by persons ignorant of the country, being considered by all those who have experienced them the most enjoyable time of the year. Gold mines in the mountains of Colorado are operated the year round under conditions of climate far more inclement.

* * * * *

SERVIA.

United States Vice Consul-General Vogel, at Belgrade, reports that Servia produces neither gold nor silver.

SPAIN.

The following information relative to the production of gold and silver in Spain was forwarded this Bureau through the United States minister at Madrid.

The gold produced by the mines of the country in the year 1900 consisted of 13,281 grams, of a money value at the factory of 43,827 pesetas. The silver produced in the mines of the country consisted of 99,095 kilograms, of a monetary value at the factory of 11,772,130 pesetas.

Taking the weight of the above as fine weight, Spain produced in 1900, 13 kilograms of fine gold of a value of \$8,640, corresponding to 418 ounces, fine; and 99,095 kilograms of fine silver of a coining value of \$4,118,388, representing 3,185,316 ounces, fine.

MINISTRY OF STATE,
Madrid, April 23, 1901.

EXCELLENCY: Supplementing the note of this ministry dated the 23d (21st) ultimo, I have the honor to transmit to your excellency, inclosed herewith, the answers of the ministry of agriculture, industry, and commerce, to questions 13, 15, and the latter portion of question 29 of the circular which accompanied the note of your excellency of the 21st of January.

I profit this occasion to renew to your excellency the assurances of my most distinguished consideration.

J. PEREZ CABALLERO.

His Excellency Mr. BELLAMY STORER,
*Envoy Extraordinary and Minister Plenipotentiary
of the United States of America.*

[Translation.]

MINISTRY OF STATE.

To question No. 13: That the gold produced by the mines of the country in the year 1900 consisted of 13,281 grams, of a money value at the factory of 43,827 pesetas.

To question No. 15: That the silver produced in the mines of the country in the year 1900 consisted of 99,095 kilograms, of a monetary value at the factory of 11,772,130 pesetas.

To the second part of question No. 29, as the first properly falls within the province of the mint: That every year the direccion-general of agriculture, industry, and commerce publishes a memorial on the mining statistics, with the compilation of which this inspeccion-general is at present engaged, but it being still the beginning of the year 1901, there has as yet only been time for the collection of data from the mine owners by the chief engineers of the different districts and the transmission of them to this department, from which the data above given has been taken, it having been as yet impossible to complete the schedules, statistics, and other recapitulations which will shortly be sent to the printer.

A correct copy.

J. PEREZ CABALLERO.

The following is condensed from the *Anuario de la Minería, Metalurgia y Electricidad de España*, for 1901, edited by Don Adriano Contreras, mining engineer and professor at the school of mines of Madrid.

The information is obtained by communication with the producers and from the records of the director-general of customs.

The total product of silver bars from the refineries amounted to 94,507 kilograms. To this are added the fine silver contents of argentiferous lead exported abroad, estimating the same at the rate of $1\frac{1}{4}$ kilograms of fine silver per ton of argentiferous lead; which gives 89,355 kilograms, making a total of 183,862 kilograms in 1900 as against 169,451 kilograms in 1899, an increase of 14,411 kilograms.

This does not include the fine silver contents of ores exported abroad, for which no estimate is made.

The export of silver bullion in 1900 amounted to 85,281 kilograms; that is to say, more than 90 per cent of the silver product of refineries was exported. The exports of silver-bearing lead are given in the following table:

Composition.	1899.	1900.
	<i>Tons.</i>	<i>Tons.</i>
Argentiferous lead.....	68,955	71,432
Argentiferous galena.....	7,641	3,524

(*Anuario de la Minería*, etc., España, 1901, pp. 113, 125-127.)

THE MINING INDUSTRY OF SPAIN.

[From the Board of Trade Journal, London, May 30, 1901, p. 482.]

His Majesty's consul at Corunna, reporting on the mining industry in Spain (*Foreign Office, Annual Series*, 2586), states that the arsenical gold pyrites of his district contain an average of about 20 per cent arsenic and from 10 to 16 dwts. of gold to the ton. The mispickel of Cornwall contains no gold and only 8 per cent of arsenic, and it is well known that these mines are the most paying and prosperous in Cornwall.

Several mines of quartz, carrying free gold, have been taken up in the province of Lugo, but so far capital has been lacking to develop them.

Several gravel or alluvial concessions on the Rio Sil to the gold-bearing properties

of the sand, of which attention was drawn in the Foreign Office Miscellaneous Report No. 538, of September 13, 1900, have been taken up, and it is said that orders have been given for the supply of dredging and washing plants to deal with the gold-bearing sand.

The principal concessions are the "Placer de Rio Sil," Societe Anonyme of Brussels, with a capital of £60,000, the Valdeorras Gold Mining Company of London.

The gravel or sand of the Rio Sil contains, according to English and Belgian experts, 1 gram, or 15.43 grains per cubic meter, and as the cost of working is about 5d. per cubic meter, these companies should do well.

Mr. A. E. Carleton, consular agent at Almeria, reports to the State Department, under date of August 29, 1901, upon the authority of the mineral statistics for 1900, published by the Spanish department of agriculture and commerce, that the production of argentiferous lead in 1900 amounted to 121,435 tons, valued at \$3,110.453.45.

SWEDEN.

United States Minister Thomas reports that the product of gold in Sweden in 1900 was 88.5 kilograms and silver 1,928.3 kilograms. This gives a value of \$58,817, representing 2,845 ounces, fine, for the gold, and a value of \$80,140, corresponding to 61,983 ounces, fine, for the silver product.

[From Bidrag Till Sveriges Officiela Statistik. Bergshandteringen. Kommerskollegii Underdaniga Berättelse, 1899, p. XIV.]

The following is compiled from the annual report of the department of commerce to the King on the state of mining for the year 1899 (the latest published):

GOLD.

The refined product for the year 1899 amounted to 106.245 kilograms, of an estimated value of 263,263 crowns. Of this quantity, 101.140 kilograms were won from copper ores and the rest from lead and silver ores. The production of former years is given in the following table:

Period.	Annual averages.	Period.	Annual averages.
	<i>Kilograms.</i>		<i>Kilograms.</i>
1861-1865	14.895	1881-1885	24.796
1866-1870	8.232	1886-1890	77.577
1871-1875	5.133	1891-1895	93.895
1876-1880	5.776		

Year.	Annual production.	Year.	Annual production.
	<i>Kilograms.</i>		<i>Kilograms.</i>
1894	93.603	1897	113.318
1895	85.291	1898	125.937
1896	114.529	1899	106.245

SILVER.

The refined product for the year 1899 amounted to 2,290.3 kilograms, of the Swedish coining value of 160,783 crowns. The production of former years is given in the following table:

Period.	Annual averages.	Period.	Annual averages.
	<i>Kilograms.</i>		<i>Kilograms.</i>
1861-1865	1,128.9	1881-1885	1,713.0
1866-1870	1,185.3	1886-1890	4,254.2
1871-1875	779.9	1891-1895	3,478.1
1876-1880	1,116.9		

Year.	Annual production.	Year.	Annual production.
	<i>Kilograms.</i>		<i>Kilograms.</i>
1894	2,869.5	1897.....	2,218.2
1895	1,188.0	1898.....	2,032.9
1896	2,082.3	1899.....	2,290.3

SWITZERLAND.

LEGATION OF THE UNITED STATES,
Berne, January 21, 1901.

SIR: An early reply being requested to interrogatories 13, 14, 15, 16, 17, and 18 in the circular of the Treasury Department dated January 2, 1901, I have the honor to report that Switzerland has no gold or silver mines and that there is no output of these metals from the refineries of this country.

I have the honor to be, sir, your obedient servant,

JOHN G. A. LEISHMAN.

HONORABLE DIRECTOR OF THE MINT.

TURKEY.

Minister Leishman, at Constantinople, writes:

As far as is known there are no gold mines at work in the Empire, and no statistics are available in regard to the production of the silver-lead mines. The proportion of silver is not likely to be considerable.

The report of the director of the French mint for 1901 contains, on page 252, the following table:

PRODUCTION OF THE PRECIOUS METALS.

Year.	Gold.		Silver.	
	Weight.	Value.	Weight.	Value.
	<i>Kilograms.</i>	<i>Francs.</i>	<i>Kilograms.</i>	<i>Francs.</i>
1893	13	44,240	7,165	740,167
1894	12	38,010	7,809	809,872
1895	8	26,595	10,208	884,415
1896	10.7	35,497	7,007	743,445
1897	21.9	73,457	7,110	516,251
1898	21	72,300	4,422	982,500

The product for 1898 is given in fine weight. The 21 kilograms represents a value in gold of \$13,957, corresponding to 675 ounces, fine, and the 4,422 kilograms of silver a coining value of \$183,778, corresponding to 142,141 ounces, fine.

The product for 1899 and 1900 is assumed to have been the same as for 1898.

URUGUAY.

Minister Finch, at Montevideo, reports that there was produced in Uruguay in 1899 61,336 grams of gold in the rough state, which contains from 65 to 70 per cent pure gold and 30 to 35 per cent pure silver. He also reports the product for 1900, which was 71,234 grams, at a commercial value of \$31,342.96.

The mean percentage of gold and silver contained in this rough product would be for gold 67½ and for silver 32½ per cent, upon which the estimate for 1899 is based, and gives gold 41.4 kilograms, fine, of

a value of \$27,514, representing 1,331 ounces, fine; silver, 20 kilograms, fine, of a value of \$831, corresponding to 643 ounces, fine.

For 1900 both the weight and value of the gold product are given. As the crude gold is stated to be associated with silver, it is possible to compute (by means of two equations) the gold and silver contents of the bullion. Taking silver at the average rate of 62 cents per ounce for 1900, we obtain a gold product of 1,492 ounces, fine, and a silver product of 798 ounces, fine, which corresponds to 34.8 per cent of the crude weight and agrees with the estimate of the Uruguay department of engineers for the previous year.

This is equivalent to 46 kilograms of gold and 25 kilograms of silver, representing, respectively, \$30,842 and \$1,032, United States coining value, equal, at the above rate, to \$501 commercial value.

The official correspondence whereon the foregoing calculation is based is given below:

LEGATION OF THE UNITED STATES,
Montevideo, October 18, 1900.

SIR: I inclose you herewith copy and translation of a communication from the minister for foreign affairs of Uruguay, dated the 12th and delivered on the 15th of the current month, inclosing certified copy of the report of the department of engineers, stating the amount of gold and silver mined in the country in 1899.

This communication is in response to mine of February 26, 1900, asking for the information herewith transmitted.

I also inclose copy and translation of the certified copy of the report of the department of engineers mentioned above.

Respectfully,

WILLIAM R. FINCH.

HON. JOHN HAY,
Secretary of State, Washington.

[Inclosure A.—Translation.]

MINISTRY OF FOREIGN AFFAIRS,
Montevideo, October 12, 1900.

MR. MINISTER: In addition to my note of the 8th March last, I have the honor to inclose your excellency, with the interrogatory you forwarded to me, a certified copy of the report returned by the national department of engineers on the production of gold and silver in this country during the year 1899.

With this motive I am pleased to renew to your excellency the assurance of my high consideration.

MANUEL HERRERO Y ESPINOSA.

His Excellency WILLIAM R. FINCH,
Envoy Extraordinary and Minister Plenipotentiary of North America.

[Inclosure B.—Translation.]

MINISTRY OF FOREIGN AFFAIRS,
NATIONAL DEPARTMENT OF ENGINEERS (INDUSTRIAL SECTION) AND OF MINES,
Montevideo, October 4, 1900.

MR. MINISTER: For the reasons explained in my note of this date it has been impossible for me to return a report on this document before now. Of the 30 questions contained in the inclosed interrogatory, this section can only answer those numbered 13, 14, 15, 16, 17, and 18.

Question No. 13. The number of kilograms of fine gold extracted from our mines can not be expressed because gold is exported without being refined. It is only known that gold in the rough state contains from 65 to 70 per cent of fine gold, and that in the year 1899 5,119,760 kilograms of auriferous quartz were taken from the

mines of Cuñapirú (Department of Rivera), from which were extracted 61,336 grams of gold in its rough state. This contains from 30 to 35 per cent of silver.

Questions Nos. 14 and 16. This country has no colonies.

Question No. 15. No silver mines are worked.

Questions Nos. 17 and 18. No gold or silver refineries exist in the country.

This is all I have to report.

F. MICHAELSSON.

It is a true copy.

OSCAR HORDEÑANA. *Chief Clerk.*

LEGATION OF THE UNITED STATES,
Montevideo, August 15, 1901.

DEAR SIR: I inclose you herewith copy and translation of a communication of the minister for foreign affairs of Uruguay, transmitting answers from the director of the industrial and mining section, or branch of the national department of engineers, to interrogatories 13, 14, 15, 16, 17, and 18. Also copy of the engineer's report.

The printed circular from the United States, which contains the interrogatories herein answered, is dated January 2, 1901.

Very truly, yours,

WILLIAM R. FINCH.

THE DIRECTOR OF THE MINT,
Washington, D. C.

[Translation.]

MINISTRY OF FOREIGN AFFAIRS,
Montevideo, August 5, 1901.

MR. MINISTER: In addition to the note of this ministry, dated February 25 last, I have the honor to inclose your excellency, together with the interrogatory which you sent on the 11th of said month, a certified copy of the report issued by the industrial and mining section of the national department of engineers on coinage of gold, silver, etc., in the Republic.

On this occasion I have the pleasure to renew to your excellency the assurance of my high consideration.

GERMAN ROOSEN.

His Excellency Mr. WILLIAM R. FINCH,
Envoy Extraordinary and Minister Plenipotentiary of North America.

[Translation.]

MINISTRY OF FOREIGN AFFAIRS,
NATIONAL DEPARTMENT OF ENGINEERS, INDUSTRIAL AND MINING SECTION,
Montevideo, July 29, 1901.

MR. DIRECTOR: The only questions which this section can answer are those contained in Nos. 13 to 18, inclusive, and does so in the following form:

13. The number of kilograms of fine gold extracted from the mines can not be expressed, for the reason that there are no gold refineries in the country. The gold in its rough state extracted from the mines in the year 1900 weighed 71,234 grams, and its commercial value is \$31,342.96.

14 and 16. This country has no colonies.

15. No silver mines are being worked in the country.

17. "Output of gold from the refineries of the country" answered in No. 13.

18. There are no silver refineries.

F. MICHAELSSON.

It is a true copy.

MIGUEL A. FLAUGIUI.

VENEZUELA.

Minister Loomis reports no production of the precious metals in Venezuela for 1900. The *Statistique de l'Industrie Minérale* gives the gold product for 1899 at 893 kilograms, fine. This represents a value of \$593,488, corresponding to 28,710 ounces, fine.

This product is repeated for 1900.

PART III.

GENERAL STATISTICS.

I.—DEPOSITS AND PURCHASES OF GOLD AND SILVER BY WEIGHT

	COINAGE MINTS.			ASSAY OFFICES.	
	Philadel- phia	San Fran- cisco.	New Orleans.	New York.	Denver.
GOLD.					
Domestic bullion, unrefined ...	<i>Stand. ozs.</i> 6,828.523	<i>Stand. ozs.</i> 231,593.542	<i>Stand. ozs.</i> 391.972	<i>Stand. ozs.</i> 346,696.365	<i>Stand. ozs.</i> 229,436.250
Domestic bullion, refinery bars	.....	.....	.....	531,003.895	446,601.350
Domestic bullion, refined.....	.....	1,309,259.664	.....	1,233,731.825	305,279.644
Total domestic bullion ..	6,828.523	1,540,853.206	391.972	2,111,432.085	981,317.244
Domestic coin, mutilated and abraded.....	6,152.491	266.635	273.457	32,504.467	11.460
Domestic coin, Treasury trans- fers	30,988.500	693.519	.....	.....	.....
Foreign bullion, unrefined	23,835.089	64,503.018	13,803.841	216,129.480	313.664
Foreign bullion, refined .....	.....	.....	.....	159,815.864	.....
Foreign coin	118.615	1,301,492.421	205.874	390,981.715	30.550
Jewelers' bars, old plate, etc...	40,199.276	1,535.845	3,532.047	156,349.381	1,117.409
Total deposits.....	108,122.494	2,909,344.635	18,207.191	3,067,212.992	982,790.327
Redeposits:					
Fine bars	1,442,348.850	.....	16.265	179,729.931	.....
Mint bars	719,332.675	.....	.....	.....	.....
Unparted bars	925,895.459	1,180,040.388	.....	.....	92.689
Total redeposits.....	3,087,576.984	1,180,040.388	16.265	179,729.931	92.689
Total gold operated upon.	3,195,699.478	4,089,385.023	18,223.456	3,246,942.923	982,883.016
SILVER.					
Domestic bullion, unrefined. ...	6,223.07	51,528.36	107.03	219,968.37	71,851.32
Domestic bullion, refinery bars	.....	.....	.....	87,034.39	9,690.65
Domestic bullion, refined.....	.....	.....	.....	3,484,899.07	.....
Total domestic bullion ..	6,223.07	51,528.36	107.03	3,791,901.83	81,541.97
Domestic coin, mutilated and abraded.....	2,350.25	74.80	411.87	172.59	.....
Domestic coin, Treasury trans- fers	2,265,237.38	126,515.28	510,790.30	.....	.....
Trade dollars	194.11	.....	87	.....	.....
Foreign bullion, unrefined	15,407.10	590,461.67	2,961.05	676,875.90	62.66
Foreign bullion, refined .....	.....	.....	.....	.....	.....
Foreign coin	4,522,466.68	.....	22.80	135,192.48	.....
Jewelers' bars, old plate, etc...	84,664.68	517.72	5,804.23	540,419.79	325.94
Total deposits.....	6,896,543.27	769,097.83	520,098.15	5,144,562.59	81,930.57
Redeposits:					
Fine bars	476.13	4,272,788.96	17,939,234.76	3,495.24	.....
Mint bars .....	.....	.....	.....	.....	.....
Standard bars .....	.....	.....	458,758.68	.....	.....
Unparted bars	147,741.29	267,782.12	.....	.....	35.93
Total redeposits.....	148,217.42	4,540,571.08	18,397,993.44	3,495.24	35.93
Total silver operated upon.	7,044,760.69	5,309,668.91	18,918,091.59	5,148,057.83	81,966.50

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1900.

ASSAY OFFICES.							Total.
Carson.	Boise.	Helena.	Charlotte.	St. Louis.	Deadwood.	Seattle.	
<i>Stand. ozs.</i> 11, 215. 964	<i>Stand. ozs.</i> 86, 463. 422	<i>Stand. ozs.</i> 85, 660. 387	<i>Stand. ozs.</i> 9, 202. 242 3, 056. 355	<i>Stand. ozs.</i> 1, 428. 036 2, 147. 217 69. 218	<i>Stand. ozs.</i> 13, 602. 529	<i>Stand. ozs.</i> 235, 175. 957	<i>Stand. ozs.</i> 1, 257, 695. 186 982, 808. 817 2, 848, 340. 351
11, 215. 964	86, 463. 422	85, 660. 387	12, 258. 597	3, 644. 471	13, 602. 529	235, 175. 957	5, 088, 844. 354
29. 562			4. 550	73. 148		5. 000	39, 320. 770
	46. 977	26, 593. 651	12. 405			932, 395. 029	31, 682. 010 1, 277, 633. 154
2. 589			2. 125			443. 366	159, 815. 864
9. 317		28. 033	117. 741	2, 133. 406		142. 991	1, 693, 277. 255 205, 165. 446
14, 257. 429	86, 510. 399	112, 282. 071	12, 395. 418	5, 851. 025	13, 602. 529	1, 168, 162. 343	8, 495, 738. 853
							1, 622, 095. 046 719, 332. 675
	2, 945. 320	45. 310		42. 653		42. 189	2, 109, 104. 008
	2, 945. 320	45. 310		42. 653		42. 189	4, 450, 531. 729
11, 257. 429	89, 455. 719	112, 327. 381	12, 395. 418	5, 893. 678	13, 602. 529	1, 168, 204. 532	12, 946, 270. 582
11, 761. 28	28, 164. 82	23, 427. 50	1, 007. 36	85. 66 15. 31	3, 054. 40	32, 460. 68	449, 639. 85 96, 740. 35 3, 484, 899. 07
11, 761. 28	28, 164. 82	23, 427. 50	1, 007. 36	100. 97	3, 054. 40	32, 460. 68	4, 031, 279. 27
			. 44				3, 009. 95
							2, 902, 542. 96 194. 98
	14. 45	12, 530. 55	1. 52			229, 363. 99	1, 527, 678. 89
. 01						. 86	4, 657, 682. 83
3. 85		7. 66	58. 99	604. 76		38. 06	632, 445. 68
11, 765. 14	28, 179. 27	35, 965. 71	1, 068. 31	705. 73	3, 054. 40	261, 863. 59	13, 754, 834. 56
							22, 215, 995. 09
	626. 34	5. 52		9. 78		37. 81	458, 758. 68 416, 238. 79
	626. 34	5. 52		9. 78		37. 81	23, 090, 992. 56
11, 765. 14	28, 805. 61	35, 971. 23	1, 068. 31	715. 51	3, 054. 40	261, 901. 40	36, 845, 827. 12

II.—DEPOSITS AND PURCHASES OF GOLD AND SILVER BY VALUE

	COINAGE MINTS.			ASSAY OFFICES.	
	Philadel- phia.	San Fran- cisco.	New Orleans.	New York.	Denver.
GOLD.					
Domestic bullion, unrefined...	\$127, 042. 29	\$4, 308, 717. 06	\$7, 292. 50	\$6, 450, 164. 93	\$4, 268, 581. 40
Domestic bullion, refinery bars.....	.....	.....	.....	9, 879, 142. 23	8, 308, 862. 32
Domestic bullion, refined.....	.....	24, 358, 319. 33	.....	22, 953, 150. 24	5, 679, 621. 28
Total domestic bullion ..	127, 042. 29	28, 667, 036. 39	7, 292. 50	39, 282, 457. 40	18, 257, 065. 00
Domestic coin mutilated and abraded.....	114, 464. 94	4, 960. 65	5, 087. 57	604, 734. 26	218. 1
Domestic coin, Treasury trans- fers	576, 530. 24	12, 902. 51	.....	.....	.....
Foreign bullion, unrefined	443, 443. 52	1, 200, 056. 15	256, 815. 65	4, 021, 013. 58	5, 835. 61
Foreign bullion, refined .....	.....	.....	.....	2, 973, 318. 40	.....
Foreign coin.....	2, 206. 79	24, 213, 812. 48	3, 830. 21	7, 274, 078. 42	568. 37
Jeweler's bars, old plate, etc...	747, 893. 51	28, 573. 86	65, 712. 50	2, 908, 825. 70	20, 789. 01
Total deposits.....	2, 011, 581. 29	54, 127, 342. 04	338, 738. 43	57, 064, 427. 76	18, 284, 471. 20
Redeposits:	.....	.....	.....	.....	.....
Fine bars	26, 834, 397. 20	.....	302. 60	3, 343, 812. 67	.....
Mint bars	13, 382, 933. 49	.....	.....	.....	.....
Unparted bars	17, 225, 962. 03	21, 954, 239. 78	.....	.....	1, 724. 45
Total redeposits.....	57, 443, 292. 72	21, 954, 239. 78	302. 60	3, 343, 812. 67	1, 724. 45
Total gold operated upon.	59, 454, 874. 01	76, 081, 581. 82	339, 041. 03	60, 408, 240. 43	18, 286, 195. 65
SILVER.					
Domestic bullion, unrefined ...	7, 241. 39	59, 960. 27	124. 54	255, 963. 19	83, 608. 81
Domestic bullion, refinery bars.....	.....	.....	.....	101, 276. 38	11, 276. 39
Domestic bullion, refined .....	.....	.....	.....	4, 055, 155. 29	.....
Total domestic bullion...	7, 241. 39	59, 960. 27	124. 54	4, 412, 394. 86	94, 885. 20
Domestic coin, mutilated and abraded.....	2, 734. 83	87. 04	479. 27	200. 83	.....
Domestic coin, Treasury trans- fers	2, 635, 912. 60	147, 217. 78	594, 374. 17	.....	.....
Trade dollars	225. 87	.....	1. 01	.....	.....
Foreign bullion, unrefined.....	17, 928. 26	687, 082. 67	3, 445. 58	787, 637. 41	72. 91
Foreign bullion, refined.....	.....	.....	.....	.....	.....
Foreign coin.....	5, 262, 506. 68	.....	26. 53	157, 314. 88	.....
Jewelers' bars, old plate, etc ...	98, 518. 90	602. 44	6, 754. 01	628, 852. 12	379. 27
Total deposits.....	8, 025, 068. 53	894, 950. 20	605, 205. 11	5, 986, 400. 10	95, 337. 38
Redeposits:	.....	.....	.....	.....	.....
Fine bars	554. 04	4, 971, 972. 61	20, 874, 745. 90	4, 067. 19	.....
Mint bars .....	.....	.....	.....	.....	.....
Standard bars .....	.....	.....	533, 828. 28	.....	.....
Unparted bars	171, 917. 14	311, 601. 01	.....	.....	41. 81
Total redeposits.....	172, 471. 18	5, 283, 573. 62	21, 408, 574. 18	4, 067. 19	41. 81
Totalsilveroperated upon	8, 197, 539. 71	6, 178, 523. 82	22, 013, 779. 29	5, 990, 467. 29	95, 379. 19

during the calendar year ended December 31, 1900.

Assay Offices.							Total.
Carson.	Boise.	Helena.	Charlotte.	St. Louis.	Dead-wood.	Seattle.	
\$208,669.03	\$1,608,621.80	\$1,593,681.62	\$171,204.49	\$26,568.11	\$253,070.31	\$4,375,366.64	\$23,398,980.18
.....	.....	.....	56,862.42	39,948.22	.....	.....	18,284,815.19
.....	.....	.....	.....	1,287.78	.....	.....	52,992,378.63
208,669.03	1,608,621.80	1,593,681.62	228,066.91	67,804.11	253,070.31	4,375,366.64	94,676,174.00
549.99	.....	.....	84.65	1,360.89	.....	93.03	731,549.19
.....	.....	.....	.....	.....	.....	.....	589,432.75
.....	873.99	494,765.60	230.79	.....	.....	17,346,884.26	23,769,919.15
.....	.....	.....	.....	.....	.....	.....	2,973,318.40
48.17	.....	.....	39.53	.....	.....	8,248.67	31,502,832.64
173.34	.....	521.54	2,190.53	39,691.27	.....	2,660.29	3,817,031.55
209,440.53	1,609,495.79	2,088,968.76	230,612.41	108,856.27	253,070.31	21,733,252.89	158,060,257.68
.....	.....	.....	.....	.....	.....	.....	30,178,512.47
.....	.....	.....	.....	.....	.....	.....	13,382,933.49
.....	54,796.65	842.98	.....	793.54	.....	784.91	39,239,144.34
.....							
.....	54,796.65	842.98	.....	793.54	.....	784.91	82,800,590.30
209,440.53	1,664,292.44	2,089,811.74	230,612.41	109,649.81	253,070.31	21,734,037.80	240,860,847.98
.....							
13,685.85	32,773.60	27,261.09	1,172.19	99.67	3,554.21	37,772.42	523,217.23
.....	.....	.....	.....	17.82	.....	.....	112,570.59
.....	.....	.....	.....	.....	.....	.....	4,055,155.29
13,685.85	32,773.60	27,261.09	1,172.19	117.49	3,554.21	37,772.42	4,690,943.11
.....	.....	.....	51	.....	.....	.....	3,502.48
.....	.....	.....	.....	.....	.....	.....	3,377,504.55
.....	.....	.....	.....	.....	.....	.....	226.88
.....	16.81	14,581.00	1.77	.....	.....	266,896.28	1,777,662.69
.....							
.01	.....	.....	.....	.....	.....	1.00	5,419,849.10
4.48	.....	8.91	68.64	703.72	.....	44.29	735,936.78
13,690.34	32,790.41	41,851.00	1,243.11	821.21	3,554.21	304,713.99	16,005,625.59
.....	.....	.....	.....	.....	.....	.....	25,851,339.74
.....	.....	.....	.....	.....	.....	.....	533,828.28
.....	728.83	6.42	.....	11.38	.....	44.00	484,350.59
.....							
.....	728.83	6.42	.....	11.38	.....	44.00	26,869,518.61
13,690.34	33,519.24	41,857.42	1,243.11	832.59	3,554.21	304,757.99	42,875,144.20

III.—DEPOSITS OF UNREFINED GOLD OF DOMESTIC PRODUCTION, WITH THE STATES BELOW 0.992) AND REFINED BULLION (FINENESS 0.992 AND OVER) OF DOMESTIC DECEMBER 31, 1900.

SOURCE.		COINAGE MINTS.			ASSAY OFFICES.	
		Philadel- phia.	San Fran- cisco.	New Or- leans.	New York.	Denver.
		<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>
1	Alabama	15.691		73.351		
2	Alaska	592.505	23,625.975	5.682	1,229.915	644.273
3	Arizona	229.405	24,010.187	228.460	810.922	37,651.912
4	California	77.826	167,934.414		928.375	330.383
5	Colorado	181.044	185.986		870.286	176,347.495
6	Georgia	841.981			169.179	
7	Idaho	456.005	470.896		95.396	514.949
8	Maryland	6.052				
9	Michigan				27.186	
10	Missouri			36.939		
11	Montana	2,704.178	82.150		27,799.832	112.136
12	Nevada		2,237.571		47,944.068	153.563
13	New Mexico	132.798	150.200		416.062	9,237.187
14	North Carolina	549.140			326.156	
15	Oregon	70.319	8,844.157			66.066
16	South Carolina					
17	South Dakota	182.259			192,900.959	131.937
18	Tennessee	5.882				
19	Texas			47.540		
20	Utah	19.933	1,492.203		72,826.810	2,675.647
21	Virginia	173.274				
22	Washington	492.494	2,304.979		351.219	
23	Wyoming	29.805	232.938			1,570.702
24	Other	67.932	21.886			
	Total unrefined	6,828.523	231,593.542	391.972	346,696.365	229,436.250
	Refinery bars (fineness below 0.992)				531,003.895	446,601.350
	Refined bullion (fineness 0.992 and over)		1,309,259.664		1,233,731.825	305,279.644
	Total gold	6,828.523	1,540,853.206	391.972	2,111,432.085	981,317.244

IV.—DEPOSITS OF UNREFINED GOLD OF DOMESTIC PRODUCTION, WITH THE STATES AND 0.992) AND REFINED BULLION (FINENESS 0.992 AND OVER) OF DOMESTIC BULLION NOT

Source.		COINAGE MINTS.			ASSAY OFFICES.	
		Philadel- phia.	San Fran- cisco.	New Or- leans.	New York.	Denver.
1	Alabama	\$291.92		\$1,364.67		
2	Alaska	11,023.35	\$439,553.02	105.71	\$22,882.14	\$11,986.48
3	Arizona	4,268.00	446,704.15	4,250.42	15,086.92	700,500.69
4	California	1,447.93	3,124,361.19		17,272.09	6,146.66
5	Colorado	3,368.26	3,460.20		16,191.37	3,280,883.62
6	Georgia	15,664.76			3,147.52	
7	Idaho	8,483.81	8,760.86		1,774.81	9,580.45
8	Maryland	112.60				
9	Michigan				505.79	
10	Missouri			687.24		
11	Montana	50,310.29	1,528.37		517,206.18	2,086.25
12	Nevada		41,629.23		891,982.66	2,856.99
13	New Mexico	2,470.66	2,794.42		7,740.69	171,854.64
14	North Carolina	10,216.56			6,068.02	
15	Oregon	1,308.26	164,542.46			1,229.14
16	South Carolina					
17	South Dakota	3,390.87			3,588,855.05	2,454.64
18	Tennessee	109.43				
19	Texas			884.46		
20	Utah	370.85	27,761.92		1,354,917.39	49,779.48
21	Virginia	3,223.70				
22	Washington	9,162.68	42,883.33		6,534.30	
23	Wyoming	554.51	4,333.73			29,222.36
24	Other	1,263.85	407.18			
	Total unrefined	127,042.29	4,308,717.06	7,292.50	6,450,164.93	4,268,581.40
	Refinery bars (fineness below 0.992)				9,879,142.23	8,308,862.32
	Refined bullion (fineness 0.992 and over)		24,358,319.33		22,953,150.24	5,679,621.28
	Total gold	127,042.29	28,667,036.39	7,292.50	39,282,457.40	18,257,065.00

AND TERRITORIES PRODUCING THE SAME, AND ALSO OF REFINERY BARS (FINENESS BULLION NOT DISTRIBUTED, BY WEIGHT, DURING THE CALENDAR YEAR ENDED

ASSAY OFFICES.							Total.	
Carson.	Boise.	Helena.	Charlotte.	St. Louis.	Deadwood.	Seattle.		
<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	
			14.130				103.172	1
	64.787	259.654		121.434		228,813.184	255,357.409	2
				5.032			62,935.918	3
1,949.119			2.527	9.199		35.973	171,267.816	4
				12.364			177,597.175	5
		145.053	5,082.002	28.411			6,266.626	6
	40,857.824	11,069.125				292.795	53,756.990	7
							6.052	8
							27.186	9
							36.939	10
	6,725.295	72,943.076				4.715	110,371.382	11
9,266.842							59,602.044	12
				1,165.342			11,101.589	13
			654.448				1,529.744	14
	38,284.344	1,086.704				190.822	48,542.412	15
			3,449.135				3,449.135	16
					13,602.529	7.211	206,824.895	17
							5.882	18
	337.858						47.540	19
							77,352.451	20
	193.314	156.775				5,831.257	173.274	21
							9,330.038	22
				86.254			1,833.445	23
							176.072	24
11,215.961	86,463.422	85,660.387	9,202.242	1,428.036	13,602.529	235,175.957	1,257,695.186	
			3,056.355	2,147.217			982,808.817	
				69.218			2,848,340.351	
11,215.961	86,463.422	85,660.387	12,258.597	3,644.471	13,602.529	235,175.957	5,088,844.354	

TERRITORIES PRODUCING THE SAME, AND ALSO OF REFINERY BARS (FINENESS BELOW DISTRIBUTED, BY VALUE, DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1900.

ASSAY OFFICES.							Total.	
Carson.	Boise.	Helena.	Charlotte.	St. Louis.	Deadwood.	Seattle.		
			\$262.88				\$1,919.47	1
	\$1,205.34	\$4,830.77		\$2,259.23		\$4,256,989.47	4,750,835.51	2
				93.62			1,170,900.80	3
\$36,262.67			47.01	171.14		669.26	3,186,377.95	4
		2,698.66	94,548.87	230.03			3,304,133.48	5
	760,145.56	205,937.21		528.58			116,588.39	6
						5,447.35	1,000,130.05	7
							112.60	8
							505.79	9
							687.24	10
	125,121.77	1,357,080.49				87.72	2,053,421.07	11
172,406.36							1,108,875.24	12
				21,680.78			206,541.19	13
			12,175.78				28,460.36	14
	712,266.86	20,217.75				3,550.18	903,114.65	15
			64,169.95				64,169.95	16
					\$253,070.31	134.16	3,847,905.03	17
							109.43	18
	6,285.73						884.46	19
							1,439,115.37	20
	3,596.54	2,916.74				108,488.50	3,223.70	21
							173,582.09	22
				1,604.73			34,110.60	23
							3,275.76	24
208,669.03	1,608,621.80	1,593,681.62	171,204.49	26,568.11	253,070.31	4,375,366.64	23,398,980.18	
			56,862.42	39,948.22			18,284,815.19	
				1,287.78			52,992,378.63	
208,669.03	1,608,621.80	1,593,681.62	228,066.91	67,804.11	253,070.31	4,375,366.64	94,676,174.00	

V.—DEPOSITS OF UNREFINED SILVER OF DOMESTIC PRODUCTION, WITH THE STATES AND 0.992) AND REFINED BULLION (FINENESS 0.992 AND OVER) OF DOMESTIC BULLION NOT

Source.		COINAGE MINTS.			ASSAY OFFICES.	
		Philadel- phia.	San Fran- cisco.	New Or- leans.	New York.	Denver.
		<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>
1	Alabama	11.04		41.32		
2	Alaska	72.64	3,570.10	.92	329.20	100.89
3	Arizona	102.37	6,904.92	57.35	284.11	16,268.39
4	California	13.13	29,380.71		179.66	70.97
5	Colorado	68.55	45.84		6,738.54	51,534.96
6	Georgia	93.24			23.15	
7	Idaho	156.16	128.34		21.45	51.01
8	Maryland	.72				
9	Michigan	1,306.26			21,422.89	
10	Missouri			7.44		
11	Montana	2,941.68	10.25		32,782.97	11.93
12	Nevada		948.72		86,603.05	15.96
13	New Mexico	25.16	20.60		22,133.54	1,677.04
14	North Carolina	1,084.15			32.14	
15	Oregon	6.82	2,398.66			13.69
16	South Carolina					
17	South Dakota	113.92			49,290.12	14.64
18	Tennessee	.32				
19	Utah	1.28	1,115.39		4.55	1,973.49
20	Virginia	27.66				
21	Washington	158.34	6,872.46		123.00	
22	Wyoming	4.52	123.29			118.35
23	Other	35.11	9.08			
	Total unrefined	6,223.07	51,528.36	107.03	219,968.37	71,851.32
	Refinery bars (fineness below 0.992)				87,034.39	9,690.65
	Refined bullion (fineness 0.992 and over)				3,484,899.07	
	Total silver	6,223.07	51,528.36	107.03	3,791,901.83	81,541.97

VI.—DEPOSITS OF UNREFINED SILVER OF DOMESTIC PRODUCTION, WITH THE STATES AND 0.992) AND REFINED BULLION (FINENESS 0.992 AND OVER) OF DOMESTIC BULLION NOT

Source.		COINAGE MINTS.			ASSAY OFFICES.	
		Philadel- phia.	San Fran- cisco.	New Or- leans.	New York.	Denver.
1	Alabama	\$12.85		\$48.08		
2	Alaska	84.53	\$4,154.30	1.07	\$383.07	\$117.40
3	Arizona	119.12	8,034.82	66.73	330.60	18,930.49
4	California	15.28	31,188.46		209.06	82.58
5	Colorado	79.77	53.34		7,841.21	59,967.95
6	Georgia	108.50			26.94	
7	Idaho	181.71	149.34		24.96	59.36
8	Maryland	.84				
9	Michigan	1,520.01			24,928.44	
10	Missouri			8.66		
11	Montana	3,423.04	11.93		38,147.46	13.88
12	Nevada		1,103.96		100,774.46	18.57
13	New Mexico	29.28	23.97		25,755.39	1,951.47
14	North Carolina	1,261.55			37.40	
15	Oregon	7.94	2,791.17			15.93
16	South Carolina					
17	South Dakota	132.56			57,355.78	17.03
18	Tennessec	.37				
19	Utah	1.49	1,297.91		5.29	2,296.43
20	Virginia	32.19				
21	Washington	184.25	7,997.04		143.13	
22	Wyoming	5.26	143.46			137.72
23	Other	40.85	10.57			
	Total unrefined	7,241.39	59,960.27	124.54	255,963.19	83,608.81
	Refinery bars (fineness below 0.992)				101,276.38	11,276.39
	Refined bullion (fineness 0.992 and over)				4,055,155.29	
	Total silver	7,241.39	59,960.27	124.54	4,412,394.86	94,885.20

TERRITORIES PRODUCING THE SAME, AND ALSO OF REFINERY BARS (FINENESS BELOW DISTRIBUTED, BY WEIGHT, DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1900.

ASSAY OFFICES.							Total.	
Carson.	Boise.	Helena.	Charlotte.	St. Louis.	Deadwood.	Seattle.		
<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	
			1.19				53.55	1
	8.36	49.26		13.45		29,855.49	34,000.31	2
				.52			23,617.66	3
1,023.51			1.00	1.20		7.12	30,677.30	4
				1.26			58,389.15	5
		7.69	379.21	.74			504.03	6
	11,546.39	2,181.76				42.71	14,127.82	7
							.72	8
							22,729.15	9
							7.44	10
	539.14	20,881.03				2.17	57,169.17	11
10,737.77				49.75			98,305.50	12
			200.88				23,906.09	13
	15,941.32	256.26				58.31	1,317.17	14
			425.08				18,675.06	15
					3,054.40	.28	425.08	16
							52,473.36	17
	85.23						.32	18
							3,179.94	19
	44.38	51.50				2,494.60	27.66	20
							9,744.28	21
				18.74			246.16	22
							62.93	23
11,761.28	28,164.82	23,427.50	1,007.36	85.66	3,054.40	32,460.68	449,639.85	
				15.31			96,740.35	
							3,484,899.07	
11,761.28	28,164.82	23,427.50	1,007.36	100.97	3,054.40	32,460.68	4,031,279.27	

TERRITORIES PRODUCING THE SAME, AND ALSO OF REFINERY BARS (FINENESS BELOW DISTRIBUTED, BY VALUE, DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1900.

ASSAY OFFICES.							Total.	
Carson.	Boise.	Helena.	Charlotte.	St. Louis.	Deadwood.	Seattle.		
			\$1.38				\$62.31	1
	\$9.73	\$57.32		\$15.65		\$34,740.93	39,564.00	2
				.60			27,482.36	3
\$1,190.99			1.16	1.40		8.28	35,697.21	4
		8.95	441.26	1.47			67,943.74	5
	13,435.80	2,538.77		.86			586.51	6
						49.70	16,439.64	7
							.84	8
							26,448.45	9
							8.66	10
	627.36	24,297.93				2.52	66,524.12	11
12 494.86				57.89			114,391.85	12
			233.75				27,818.00	13
	18,549.90	298.19				67.85	1,532.70	14
			494.64				21,730.98	15
					\$3,554.21	.33	494.64	16
							61,059.91	17
	99.17						.37	18
							3,700.29	19
	51.64	59.93				2,902.81	32.19	20
							11,338.80	21
				21.80			286.44	22
							73.22	23
13,685.85	32,773.60	27,261.09	1,172.19	99.67	3,554.21	37,772.42	523,217.23	
				17.82			112,570.59	
							4,055,155.29	
13,685.85	32,773.60	27,261.09	1,172.19	117.49	3,554.21	37,772.42	4,690,943.11	

VII.—BARS MANUFACTURED OF GOLD AND SILVER, BY WEIGHT,

Description.	COINAGE MINTS.			ASSAY OFFICES.	
	Philadel- phia.	San Fran- cisco.	New Orleans.	Carson.	New York.
GOLD.	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>
Fine bars	146,680.961	.....	389.755	.....	2,889,941.996
Mint bars .....	.....	.....	.....	.....	354,161.099
Standard bars .....	.....	.....	.....	.....	185,113.526
Unparted bars .....	.....	212.730	.....	11,257.429	1,738.590
Total gold	146,680.961	212.730	389.755	11,257.429	3,430,955.211
SILVER.					
Fine bars	88,531.56	585,068.77	4,356.79	.....	5,082,326.47
Mint bars .....	.....	.....	.....	.....	78,726.91
Standard bars .....	.....	.....	.....	.....	2,715.75
Unparted bars .....	.....	80.29	.....	11,765.14	270.04
Total silver	88,531.56	585,149.06	4,356.79	11,765.14	5,164,039.17

VIII.—BARS MANUFACTURED OF GOLD AND SILVER, BY VALUE,

Description.	COINAGE MINTS.			ASSAY OFFICES.	
	Philadel- phia.	San Fran- cisco.	New Orleans.	Carson.	New York.
GOLD.					
Fine bars	\$2,728,948.11	.....	\$7,251.26	.....	\$53,766,362.72
Mint bars .....	.....	.....	.....	.....	6,589,043.70
Standard bars .....	.....	.....	.....	.....	3,443,972.58
Unparted bars .....	.....	\$3,957.77	.....	\$209,440.53	32,345.86
Total gold	2,728,948.11	3,957.77	7,251.26	209,440.53	63,831,724.86
SILVER.					
Fine bars	103,018.54	680,807.30	5,069.72	.....	5,913,979.89
Mint bars .....	.....	.....	.....	.....	91,609.49
Standard bars .....	.....	.....	.....	.....	3,160.15
Unparted bars .....	.....	93.43	.....	13,690.34	314.23
Total silver	103,018.54	680,900.73	5,069.72	13,690.34	6,009,063.76
Total gold and silver	2,831,966.65	684,858.50	12,320.98	223,130.87	69,840,788.62

IX.—STATEMENT OF DOMESTIC MUTILATED AND UNCURRENT GOLD AND SILVER COINS
SHOWING WEIGHT, FACE VALUE, COINING VALUE, AND LOSS,

Denominations.	PHILADELPHIA.		SAN FRANCISCO.		NEW ORLEANS.	
	Received from Treasury.	Purchased.	Received from Treasury.	Purchased.	Received from Treasury.	Purchased.
GOLD.						
Double eagles	\$279,780.00	\$33,540.00	\$4,140.00	\$3,200.00	.....	\$1,820.00
Eagles	124,130.00	26,470.00	3,720.00	820.00	.....	760.00
Half eagles	167,780.00	49,335.00	5,300.00	1,375.00	.....	2,260.00
Three-dollar pieces	174.00	66.00	3.00	12.00	.....	15.00
Quarter eagles	8,467.50	5,627.50	2.50	45.00	.....	217.50
Dollars	103.00	259.00	.....	15.00	.....	89.00
Total gold, face value	580,434.50	115,297.50	13,165.50	5,467.00	.....	5,161.50
SILVER.						
Lafayette souvenir dollars .....	.....	26.00	.....	.....	.....	.....
Trade dollars .....	.....	223.00	.....	.....	.....	1.00
Standard dollars .....	.....	1,095.00	.....	13.00	.....	254.00
Half dollars	1,229,951.00	839.00	93,000.00	53.50	358,629.00	108.50
Quarter dollars	1,037,167.25	557.50	48,500.00	14.25	228,203.50	84.25
Twenty-cent pieces	239.60	.....	3.40	.....	28.40	.20
Dimes	720,055.30	351.90	24,402.00	15.20	88,333.10	71.60
Half dimes	1,494.60	38.25	115.75	.85	164.80	9.90
Three-cent pieces	261.55	11.61	.....	.....	1.20	.24
Total silver, face value	2,989,169.30	3,142.26	166,021.15	96.80	675,360.00	529.69
SUMMARY.						
	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>
Gold coin	30,988.500	6,152.491	693.510	266.635	.....	273.457
Silver coin	2,265,237.38	2,544.36	126,515.28	74.80	510,790.30	412.74
Gold, coining value ...	\$576,530.24	\$114,464.94	\$12,902.51	\$4,960.65	.....	\$5,087.57
Silver, subsidiary coin- ing value	2,818,335.81	3,165.61	157,406.25	93.06	\$635,508.92	513.52
Silver, dollar coining value	2,635,912.60	2,960.70	147,217.78	87.04	594,374.17	480.28
Loss, gold	3,904.26	832.56	262.99	506.35	.....	73.93
Loss, silver	170,833.49	.....	8,614.90	3.74	39,851.08	16.17
Gain, silver .....	.....	23.35	.....	.....	.....	.....

X.—QUANTITY AND COST OF SILVER USED IN THE COINAGE OF SILVER DOLLARS DURING THE CALENDAR YEAR 1900, UNDER ACT OF JULY 14, 1890.

MINT AT PHILADELPHIA.

Month.	Coined.		Dollars coined.	Seigniorage.
	Standard ounces.	Cost.		
1900.				
January				
February	378,125.00	\$307,912.88	440,000	\$132,087.12
March	1,375,323.98	1,119,947.01	1,600,377	480,429.99
April	1,222,031.25	995,118.43	1,422,000	426,881.57
May	48,125.00	39,188.91	56,000	16,811.09
June	116.02	94.48	135	40.52
July				
August				
September	1,289,148.45	1,049,772.96	1,500,100	450,327.04
October	1,720,468.75	1,401,003.58	2,002,000	600,996.42
November	1,136,093.75	925,138.23	1,322,000	396,861.77
December	419,632.81	341,713.31	488,300	146,586.69
Total	7,589,065.01	6,179,889.79	8,830,912	2,651,022.21

MINT AT SAN FRANCISCO.

1900.				
January				
February				
March	429,687.50	\$349,889.24	500,000	\$150,110.76
April				
May				
June				
July				
August				
September	859,375.00	699,792.98	1,000,000	300,207.02
October	859,375.00	699,794.42	1,000,000	300,205.58
November				
December	893,750.00	727,787.72	1,040,000	312,212.28
Total	3,042,187.50	2,477,264.36	3,540,000	1,062,735.64

MINT AT NEW ORLEANS.

1900.				
January	1,332,031.25	\$1,084,684.44	1,550,000	\$465,315.56
February	1,289,062.50	1,049,696.80	1,500,000	450,303.20
March	1,718,750.00	1,399,597.97	2,000,000	600,402.03
April	1,289,062.50	1,049,699.90	1,500,000	450,300.10
May	1,289,062.50	1,049,699.90	1,500,000	450,300.10
June	859,375.00	699,801.13	1,000,000	300,198.87
July	541,406.35	440,874.85	630,000	189,125.15
August	343,750.00	279,920.54	400,000	120,079.46
September	859,375.00	699,801.52	1,000,000	300,198.48
October				
November	979,687.50	797,774.06	1,140,000	342,225.94
December	317,968.75	258,926.67	370,000	111,073.33
Total	10,819,531.35	8,810,477.78	12,590,000	3,779,522.22

SUMMARY.

1900.				
January	1,332,031.25	\$1,084,684.44	1,550,000	\$465,315.56
February	1,667,187.50	1,357,609.68	1,940,000	582,390.32
March	3,523,761.48	2,869,434.22	4,100,377	1,230,942.78
April	2,511,093.75	2,044,818.33	2,922,000	877,181.67
May	1,337,187.50	1,088,888.81	1,556,000	467,111.19
June	859,491.02	699,895.61	1,000,135	300,239.39
July	541,406.35	440,874.85	630,000	189,125.15
August	343,750.00	279,920.54	400,000	120,079.46
September	3,007,898.45	2,449,367.46	3,500,100	1,050,732.54
October	2,579,813.75	2,100,798.00	3,002,000	901,202.00
November	2,115,781.25	1,722,912.29	2,462,000	739,087.71
December	1,631,351.56	1,328,427.70	1,898,300	569,872.30
Total	21,450,783.86	17,467,631.93	24,960,912	7,493,280.07

XI.—QUANTITY AND COST OF METAL OBTAINED BY TRANSFER AND PURCHASE, FOR SUBSIDIARY SILVER COINAGE, COINAGE DERIVED THEREFROM, AND SEIGNIORAGE ON SAME, DURING THE CALENDAR YEAR 1900.

Sources from which bullion was obtained.	Standard ounces.	Cost.	Coinage.	Seigniorage.
MINT AT PHILADELPHIA.				
Uncurrent coins transferred from Treasury.....	2,265,237.38	\$2,818,335.81	\$2,787,000.00	.....
Amount transferred from act July 14, 1890.....	3,066,306.25	2,496,939.30	3,815,000.00	\$1,318,060.70
Amount Porto Rican coins redeemed and melted.....	4,522,370.39	3,419,521.08	.....	.....
Partings, charges, and fractions purchased.....	166,130.10	90,317.42	43,775.20	21,145.85
Melted assay coins purchased.....	828.03	989.26		
Mutilated coins purchased.....	1,663.23	903.88		
Surplus bullion purchased.....	11,800.11	7,114.56		
Total.....	10,034,335.49	8,834,121.31	6,645,775.20	1,339,206.55
MINT AT SAN FRANCISCO.				
Uncurrent coins transferred from Treasury.....	126,515.28	157,406.25	131,634.25	.....
Amount transferred from act July 14, 1890.....	1,613,930.00	1,314,223.79	2,008,000.00	693,776.21
Partings, charges, and fractions purchased.....	325,131.73	178,430.74	122,000.00	53,204.67
Mutilated coins purchased.....	74.80	41.68		
Surplus bullion purchased.....	3,068.53	1,703.95		
Total.....	2,068,720.34	1,651,806.41	2,261,634.25	746,980.88
MINT AT NEW ORLEANS.				
Uncurrent coins transferred from Treasury.....	510,790.30	635,508.92	635,000.00	.....
Amount transferred from act July 14, 1890.....	1,400,534.38	1,140,475.62	1,742,500.00	602,024.38
Partings, charges, and fractions purchased.....	49,585.48	27,822.19	49,500.00	15,908.44
Mutilated coins purchased.....	412.74	225.26		
Surplus bullion purchased.....	11.75	5.61		
Total.....	1,961,334.65	1,804,037.60	2,427,000.00	617,932.82
SUMMARY.				
Uncurrent coins transferred from Treasury.....	2,902,542.96	3,611,250.98	3,553,634.25	.....
Amount transferred from act July 14, 1890.....	6,080,770.63	4,951,638.71	7,565,500.00	2,613,861.29
Amount Porto Rican coins redeemed and melted.....	4,522,370.39	3,419,521.08	.....	.....
Partings, charges, and fractions purchased.....	540,847.31	296,570.35	215,275.20	90,258.96
Melted assay coins purchased.....	828.03	989.26		
Mutilated coins purchased.....	2,150.77	1,170.82		
Surplus bullion purchased.....	14,880.39	8,824.12		
Total.....	14,064,390.48	12,289,965.32	11,334,409.45	2,704,120.25

XII.—SILVER FOR SUBSIDIARY COINAGE CALENDAR YEAR 1900.

Stock.	Standard ounces.	Cost.
MINT AT PHILADELPHIA.		
Silver bullion on hand Jan. 1, 1900.....	109,653.96	\$115,696.97
Uncurrent coins transferred from Treasury	2,265,237.38	2,818,335.81
Amount transferred from act, July 14, 1890	3,066,306.25	2,496,939.30
Amount Porto Rican coins redeemed and melted	4,522,370.39	3,419,521.08
Partings, charges, and fractions purchased.....	166,130.10	90,317.42
Melted assay coins purchased	828.03	989.26
Mutilated coins purchased	1,663.23	903.88
Surplus bullion purchased.....	11,800.11	7,114.56
Total.....	10,143,989.45	8,949,818.28
Used in coinage, calendar year 1900	5,341,541.82	5,306,568.65
Amount sold in sweeps	9,429.35	5,689.96
Wasted by operative officers.....	8,633.17	5,205.14
Balance on hand Jan. 1, 1901	4,784,385.11	3,632,354.53
Total.....	10,143,989.45	8,949,818.28
MINT AT SAN FRANCISCO.		
Silver bullion on hand Jan. 1, 1900	113,394.97	92,836.46
Uncurrent coins transferred from Treasury	126,515.28	157,406.25
Amount transferred from act July 14, 1890	1,613,930.00	1,314,223.79
Partings, charges, and fractions purchased	325,131.73	178,430.74
Mutilated coins purchased	74.80	41.68
Surplus bullion purchased.....	3,068.53	1,703.95
Total	2,182,115.31	1,744,642.87
Used in coinage, calendar year 1900	1,817,788.53	1,514,653.37
Amount sold in sweeps	9,418.16	5,394.34
Wasted by operative officers.....	675.86	375.35
Balance on hand Jan. 1, 1901.....	354,232.76	224,219.81
Total	2,182,115.31	1,744,642.87
MINT AT NEW ORLEANS.		
Silver bullion on hand Jan. 1, 1900	46,422.32	41,843.68
Uncurrent coins transferred from Treasury.....	510,790.30	635,508.92
Amount transferred from act July 14, 1890.....	1,400,534.38	1,140,475.62
Partings, charges, and fractions purchased.....	49,585.48	27,822.19
Mutilated coins purchased.....	412.74	225.26
Surplus bullion purchased.....	11.75	5.61
Total	2,007,756.97	1,845,881.28
Used in coinage calendar year 1900	1,950,701.25	1,809,067.18
Amount sold in sweeps	32,324.66	19,916.11
Wasted by operative officers.....	17,804.21	8,503.18
Balance on hand Jan. 1, 1901.....	6,926.85	8,394.81
Total	2,007,756.97	1,845,881.28
SUMMARY.		
Silver bullion on hand Jan. 1, 1900	269,471.25	250,377.11
Uncurrent coins transferred from Treasury.....	2,902,542.96	3,611,250.98
Amount transferred from act July 14, 1890.....	6,080,770.63	4,951,638.71
Amount Porto Rican coins redeemed and melted.....	4,522,370.39	3,419,521.08
Partings, charges, and fractions purchased.....	540,847.31	296,570.35
Melted assay coins purchased	828.03	989.26
Mutilated coins purchased	2,150.77	1,170.82
Surplus bullion purchased.....	14,880.39	8,824.12
Total.....	14,333,861.73	12,540,342.43
Used in coinage, calendar year 1900	9,110,031.60	8,630,289.20
Amount sold in sweeps	51,172.17	31,000.41
Wasted by operative officers	27,113.24	14,083.67
Balance on hand Jan. 1, 1901	5,145,544.72	3,864,969.15
Total.....	14,333,861.73	12,540,342.43

XIII.—COINAGE EXECUTED AT THE MINTS OF THE UNITED

Denominations.	PHILADELPHIA.	
	Pieces.	Value.
GOLD.		
Double eagles.....	1, 874, 584	\$37, 491, 680. 00
Eagles	293, 960	2, 939, 600. 00
Half eagles.....	1, 405, 730	7, 028, 650. 00
Quarter eagles	67, 205	168, 012. 50
Total gold	3, 641, 479	47, 627, 942. 50
SILVER.		
Dollars, act of July 14, 1890	^a 8, 880, 912	^a 8, 880, 912. 00
Subsidiary:		
Half dollars.....	4, 762, 912	2, 381, 456. 00
Quarter dollars	10, 016, 912	2, 504, 228. 00
Dimes.....	17, 600, 912	1, 760, 091. 20
Total subsidiary	32, 380, 736	6, 645, 775. 20
Total silver	41, 261, 648	15, 526, 687. 20
MINOR.		
Five-cent nickels	27, 255, 995	1, 362, 799. 75
One-cent bronze	66, 833, 764	668, 337. 64
Total minor.....	94, 089, 759	2, 031, 137. 39
Total coinage	138, 992, 886	65, 185, 767. 09

^a Includes 50,000 Lafayette souvenir dollars, act March 3, 1899.

The mint at Philadelphia coined, in addition to the above, for the Government of Costa Rica—

20-colón pieces, gold	5, 000
10-colón pieces, gold	140, 000
5-colón pieces, gold	100, 000
2-colón pieces, gold	125, 000
Total.....	370, 000
Value	\$1, 047, 041. 40

STATES DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1900.

SAN FRANCISCO.		NEW ORLEANS.		TOTAL.	
Pieces.	Value.	Pieces.	Value.	Pieces.	Value.
2,459,500	\$49,190,000.00	.....	.....	4,334,084	\$86,681,680.00
81,000	810,000.00	.....	.....	374,960	3,749,600.00
329,000	1,645,000.00	.....	.....	1,734,730	8,673,650.00
.....	.....	.....	.....	67,205	168,012.50
2,869,500	51,645,000.00	.....	.....	6,510,979	99,272,942.50
3,540,000	3,540,000.00	12,590,000	\$12,590,000.00	*25,010,912	*25,010,912.00
2,560,322	1,280,161.00	2,744,000	1,372,000.00	10,067,234	5,033,617.00
1,858,585	464,646.25	3,416,000	854,000.00	15,291,497	3,822,874.25
5,168,270	516,827.00	2,010,000	201,000.00	24,779,182	2,477,918.20
9,587,177	2,261,634.25	8,170,000	2,427,000.00	50,137,913	11,334,409.45
13,127,177	5,801,634.25	20,760,000	15,017,000.00	75,148,825	36,345,321.45
.....	.....	.....	.....	27,255,995	1,362,799.75
.....	.....	.....	.....	66,833,764	668,337.64
.....	.....	.....	.....	94,089,759	2,031,137.39
15,996,677	57,446,634.25	20,760,000	15,017,000.00	175,749,563	137,649,401.34

* Includes 50,000 Lafayette souvenir dollars, act March 3, 1899.

Coinage of silver dollars:

Act of February 28, 1878 (Bland-Allison)	\$378,166,793
Act of July 14, 1890 (Sherman), as follows—	
From July 14, 1890, to date of repeal of purchasing clause of Sherman	
act, October 31, 1893.....	\$36,087,285
From November 1, 1893, to June 12, 1898.....	42,139,872
Coined under war-revenue bill approved June 13, 1898.....	48,916,193
	127,143,350
Act of March 3, 1891, recoinage of trade dollars	5,078,472
Total.....	510,388,615

XIV.—ASSETS AND LIABILITIES OF THE UNITED STATES

ASSETS.

Institutions.	Gold bullion.		Silver bullion.		Value of gold bullion shipped for coinage.
	Standard ounces.	Value.	Standard ounces.	Value (cost).	
COINAGE MINTS.					
Philadelphia.....	4,334,702.035	\$80,645,619.25	61,485,469.25	\$49,804,900.24	.....
San Francisco	1,484,249.641	27,613,946.76	1,514,132.13	1,168,735.08	.....
New Orleans.....	56,293.788	1,047,326.26	9,771,801.85	7,960,077.59	.....
New Orleans (silver bullion in transit) ..	.....	.....	1,205,000.88	981,250.34	.....
ASSAY OFFICES.					
New York.....	2,312,776.910	43,028,407.65	900,327.03	690,475.09	.....
Carson.....	596.752	11,102.36	2,517.34	1,342.60	.....
Denver.....	30,585.546	569,033.42	2,703.58	1,541.04	\$105,365.35
Helena.....	1,071.111	19,927.65	338.43	192.91	.....
Boise.....	2,353.174	43,779.98	477.30	272.06	.....
Charlotte	146.407	2,723.86	27.88	15.89	.....
St. Louis	275.966	5,134.25	53.14	30.23	.....
Deadwood	952.237	17,716.04	295.42	168.96	.....
Seattle	4,845.790	90,154.24	1,116.23	636.25	84,448.71
Total.....	8,228,849.357	153,094,871.72	74,884,261.46	60,609,638.28	189,814.06

LIABILITIES.

Institutions.	Bullion fund.	Undeposited earnings.
COINAGE MINTS.		
Philadelphia.....	\$252,278,489.52	.....
San Francisco.....	109,967,862.36	.....
New Orleans.....	23,195,743.47	.....
New Orleans (silver bullion in transit) ..	981,250.34	.....
ASSAY OFFICES.		
New York.....	44,648,160.31	\$1,672.00
Carson.....	167,659.72	237.37
Denver.....	1,228,538.01	2,026.32
Helena.....	20,051.83	68.73
Boise.....	163,502.61	1,234.31
Charlotte.....	29,340.18	171.19
St. Louis.....	16,203.89	85.75
Deadwood.....	74,388.04	164.01
Seattle.....	1,342,020.19	5,194.67
Total.....	434,113,210.47	10,854.35

MINTS AND ASSAY OFFICES, DECEMBER 31, 1900.

ASSETS.

Gold coin.	Silver coin.	Credit balance with assistant treasurer and depository banks.	Minor coin.	Minor coinage metal.	Deficiencies.	Total.
\$38,578,467.50	\$83,488,132.86	.....	\$294,534.71	\$67,664.52	\$13,543.82	\$252,892,862.90
24,304,180.00	55,196,570.53	^a \$1,688,373.34	.....	.....	413,557.96	110,385,363.67
347,155.00	13,990,211.73	.....	.....	.....	25,000.00	23,369,770.58
.....	.....	.....	.....	.....	.....	981,250.34
.....						
5,620.00	4,320.47	^b 957,583.76	.....	.....	.....	44,686,406.97
18,468.10	8,518.21	^a 52,916.04	.....	.....	75,549.75	167,897.09
.....	.....	554,624.52	.....	.....	.....	1,230,564.33
.....	.....	.....	.....	.....	.....	20,120.56
.....	.....	120,684.88	.....	.....	.....	164,736.92
.....	.....	26,771.62	.....	.....	.....	29,511.37
.....	.....	11,125.16	.....	.....	.....	16,289.64
.....	.....	56,667.05	.....	.....	.....	74,552.05
.....	.....	1,174,522.48	.....	.....	.....	1,349,761.68
63,253,890.60	152,687,753.83	4,643,268.85	294,534.71	67,664.52	527,651.53	435,369,088.10

LIABILITIES.

Seigniorage on silver.	Unpaid deposi- tors.	Minor coinage profits.	Minor coin metal fund.	Unpaid cent depositors and subtreasury transfers.	Total.
\$146,767.58	\$105,406.57	\$47,291.22	\$49,255.30	\$265,652.71	\$252,892,862.90
312,212.28	105,289.03	.....	.....	.....	110,385,363.67
173,953.32	73.79	.....	.....	.....	23,369,770.58
.....	.....	.....	.....	.....	981,250.34
.....					
.....	36,574.66	.....	.....	.....	44,686,406.97
.....	.....	.....	.....	.....	167,897.09
.....	.....	.....	.....	.....	1,230,564.33
.....	.....	.....	.....	.....	20,120.56
.....	.....	.....	.....	.....	164,736.92
.....	.....	.....	.....	.....	29,511.37
.....	.....	.....	.....	.....	16,289.64
.....	.....	.....	.....	.....	74,552.05
.....	2,546.82	.....	.....	.....	1,349,761.68
632,933.18	249,890.87	47,291.22	49,255.30	265,652.71	435,369,088.10

^a Gold coin.

^b Gold coin, \$894,236.81; silver coin, \$63,346.95.

XV.—UNREFINED GOLD AND SILVER OF DOMESTIC PRODUCTION, BY VALUE, ITS DISTRIBUTION BY STATES AND TERRITORIES; ALSO REFINED DOMESTIC BULLION (NOT DISTRIBUTED) DEPOSITED AT THE MINTS AND ASSAY OFFICES FROM THEIR ORGANIZATION TO THE CLOSE OF THE CALENDAR YEAR ENDED DECEMBER 31, 1900.

Locality.	Gold.	Silver.	Total.
Alabama	\$271,809.48	\$660.67	\$272,470.15
Alaska	9,364,820.63	90,665.93	9,455,486.56
Arizona	11,865,196.67	14,181,818.25	26,047,014.92
California	785,724,700.43	4,496,197.34	790,220,897.77
Connecticut	125.82	.....	125.82
Colorado	85,626,618.12	25,181,385.73	110,808,003.85
Georgia	9,965,519.54	10,645.88	9,976,165.42
Idaho	41,260,546.45	2,071,204.97	43,331,751.42
Indiana	83.39	.43	83.82
Iowa	1,318.17	8.03	1,326.20
Kansas	69.32	.25	69.57
Maine	35,703.62	3,719.21	39,422.83
Maryland	19,535.46	45.11	19,580.57
Michigan	502,652.10	4,268,374.66	4,771,026.76
Minnesota	9,048.14	116.27	9,164.41
Missouri	893.61	538.62	1,432.23
Montana	85,030,031.02	22,469,558.08	107,499,589.10
Nebraska	2,340.26	273,226.13	275,566.39
Nevada	43,386,429.47	105,654,366.95	149,040,796.42
New Hampshire	481.34	1.75	483.09
New Mexico	7,111,146.58	7,206,110.81	14,317,257.39
New York	1,058.83	.62	1,059.45
North Carolina	12,048,943.57	70,729.80	12,119,673.37
Oregon	26,398,154.71	169,311.64	26,567,466.35
South Carolina	2,765,737.65	6,551.68	2,772,289.33
South Dakota	75,817,063.94	1,363,206.18	77,180,270.12
Tennessee	92,481.05	18.00	92,499.05
Texas	11,451.02	3,461.77	14,912.79
Utah	4,482,448.56	19,963,669.44	24,446,118.00
Vermont	79,850.34	93.68	79,944.02
Virginia	1,785,772.90	542.18	1,786,315.08
Washington	1,781,082.13	34,659.07	1,815,741.20
West Virginia	243.74	3.72	247.46
Wisconsin	1,109.77	38.54	1,148.31
Wyoming	988,570.81	14,146.36	1,002,717.17
Other sources	42,210,235.39	42,962,930.58	85,173,165.97
Unrefined	1,248,643,274.03	250,498,008.33	1,499,141,282.36
Refined	767,683,744.19	560,915,771.26	1,328,599,515.45
Total	2,016,327,018.22	811,413,779.59	2,827,740,797.81

XVI.—PRODUCT OF GOLD AND SILVER IN THE UNITED STATES FROM 1792 TO 1844, AND ANNUALLY SINCE.

[The estimate for 1792-1873 is by R. W. Raymond, commissioner, and since by Director of the Mint.]

Years.	Gold.	Silver (coining value).	Total.
Apr. 2, 1792-July 31, 1834	\$14,000,000	Insignificant.	\$14,000,000
July 31, 1834-Dec. 31, 1844	7,500,000	\$250,000	7,750,000
1845	1,008,000	50,000	1,058,000
1846	1,140,000	50,000	1,190,000
1847	889,000	50,000	939,000
1848	10,000,000	50,000	10,050,000
1849	40,000,000	50,000	40,050,000
1850	50,000,000	50,000	50,050,000
1851	55,000,000	50,000	55,050,000
1852	60,000,000	50,000	60,050,000
1853	65,000,000	50,000	65,050,000
1854	60,000,000	50,000	60,050,000
1855	55,000,000	50,000	55,050,000
1856	55,000,000	50,000	55,050,000
1857	55,000,000	50,000	55,050,000
1858	50,000,000	500,000	50,500,000
1859	50,000,000	100,000	50,100,000
1860	46,000,000	150,000	46,150,000
1861	43,000,000	2,000,000	45,000,000
1862	39,200,000	4,500,000	43,700,000
1863	40,000,000	8,500,000	48,500,000
1864	46,100,000	11,000,000	57,100,000
1865	53,225,000	11,250,000	64,475,000
1866	53,500,000	10,000,000	63,500,000
1867	51,725,000	13,500,000	65,225,000
1868	48,000,000	12,000,000	60,000,000
1869	49,500,000	12,000,000	61,500,000
1870	50,000,000	16,000,000	66,000,000

XVI.—PRODUCT OF GOLD AND SILVER IN THE UNITED STATES FROM 1792 TO 1844, AND ANNUALLY SINCE—Continued.

Years.	Gold.	Silver (coining value).	Total.
1871.....	\$43,500,000	\$23,000,000	\$66,500,000
1872.....	36,000,000	28,750,000	64,750,000
1873.....	36,000,000	35,750,000	71,750,000
1874.....	33,500,000	37,300,000	70,800,000
1875.....	33,400,000	31,700,000	65,100,000
1876.....	39,900,000	38,800,000	78,700,000
1877.....	46,900,000	39,800,000	86,700,000
1878.....	51,200,000	45,200,000	96,400,000
1879.....	38,900,000	40,800,000	79,700,000
1880.....	36,000,000	39,200,000	75,200,000
1881.....	34,700,000	43,000,000	77,700,000
1882.....	32,500,000	46,800,000	79,300,000
1883.....	30,000,000	46,200,000	76,200,000
1884.....	30,800,000	48,800,000	79,600,000
1885.....	31,800,000	51,600,000	83,400,000
1886.....	35,000,000	51,000,000	86,000,000
1887.....	33,000,000	53,350,000	86,350,000
1888.....	33,175,000	59,195,000	92,370,000
1889.....	32,800,000	64,646,000	97,446,000
1890.....	32,845,000	70,465,000	103,310,000
1891.....	33,175,000	75,417,000	108,592,000
1892.....	33,000,000	82,101,000	115,101,000
1893.....	35,955,000	77,576,000	113,531,000
1894.....	39,500,000	64,000,000	103,500,000
1895.....	46,610,000	72,051,000	118,661,000
1896.....	53,088,000	76,069,000	129,157,000
1897.....	57,363,000	69,637,000	127,000,000
1898.....	64,463,000	70,384,000	134,847,000
1899.....	71,053,000	70,807,000	141,860,000
1900.....	79,171,000	74,533,000	153,704,000
Total	2,385,085,000	1,730,331,000	4,115,416,000

XVII.—PRECIOUS METAL PRODUCT, UNITED STATES AND MEXICO.

WELLS, FARGO & Co.,
San Francisco, December 31, 1900.

DEAR SIR: The following is our annual report of precious metals produced in the States and Territories west of the Missouri River (including British Columbia and Yukon territory) during 1900, which shows in the aggregate: Gold, \$99,100,733; silver, \$42,402,502; copper, \$69,752,284; lead, \$18,059,908; total gross result, \$229,-315,427. The “commercial” value at which the several metals named herein have been estimated is: Silver, 61 cents per ounce; copper, 16 cents per pound, and lead, \$4.37 per hundredweight.

Allowance must always be made for probable variations from reported figures by reason of constantly increasing facilities for transporting bullion, ores, and base metals from the mines outside of the express and the difficulty of getting entirely reliable data from private sources. Estimates obtained in this way are liable to be exaggerated and are, to a considerable degree, guesswork; but with some modifications on this account, made herein, the general results reached, while only approximately correct, may be accepted as the closest approximation possible under the circumstances.

States and Territories.	Gold dust and bullion by express.	Gold dust and bullion by other conveyances.	Silver bullion by express.	Ores and base bullion by freight.	Total.
California	\$12,383,269	\$2,038,366	\$202,948	\$3,766,171	\$18,390,754
Nevada.....	1,638,230	1,169,283	514,510	381,914	3,703,937
Oregon	1,246,564	1,053,050	131,420	5,000	2,436,034
Washington	280,487	56,462	165,353	173,848	676,150
Alaska.....	.....	6,949,244	.....	136,066	7,085,310
Idaho.....	2,150,000	.....	3,672,013	5,824,787	11,646,800
Montana	5,064,150	.....	10,370,000	42,474,000	57,908,150
Utah.....	2,148,233	2,115,181	183,538	13,172,426	17,619,378
Colorado	27,175,000	.....	14,960,500	5,780,730	47,916,230
New Mexico.....	353,270	607,224	112,004	2,277,047	3,349,545
Arizona	1,361,570	1,393,590	631,840	17,819,029	21,206,029
Dakota	6,150,000	.....	140,000	75,000	6,365,000
Texas.....	3,000	.....	195,300	.....	198,300
Wyoming.....	75,000	345,000	11,000	85,000	516,000
British Columbia and Yukon territory.....	23,344,560	.....	3,750,000	3,203,250	30,297,810
Total	83,373,333	15,727,400	35,040,426	95,174,268	229,315,427

The gross yield for 1900, shown above, segregated, is approximately as follows:

Metal.	Per cent of total.	Total value.
Gold	43. 21	\$99,100,733
Silver	18. 49	42,402,502
Copper	30. 42	69,752,284
Lead	7. 88	18,059,908
Total.....	100	229,315,427

The year's combined product of the metals herein treated of is the greatest in the history of the countries—United States of America and British Columbia and Yukon territory—that of gold, \$99,100,733, being above any previous record officially reported, but the world's output of gold for 1900, approximately \$236,000,000, shows a decrease of about \$68,000,000 from last year. Australasia decreased \$6,000,000, while the Boer war was the cause of falling away of the product of South Africa. The British possessions of the Northwest increased \$6,000,000 and the United States of North America about \$3,000,000.

ANNUAL PRODUCTS OF LEAD, COPPER, SILVER, AND GOLD IN THE STATES AND TERRITORIES WEST OF THE MISSOURI RIVER, INCLUDING BRITISH COLUMBIA AND YUKON TERRITORY, 1870-1900.

Year.	Product as per W. F. & Co. statements, including amounts from British Columbia and Yukon territory.	Product after deducting amounts from British Columbia and Yukon territory.
1870	\$54,000,000	\$52,150,000
1871	58,284,000	55,784,000
1872	62,236,959	60,351,824
1873	72,258,693	70,139,860
1874	74,401,045	71,965,610
1875	80,889,057	76,703,433
1876	90,875,173	87,219,859
1877	98,421,754	95,811,582
1878	81,154,622	78,276,167
1879	75,349,501	72,688,888
1880	80,167,936	77,232,512
1881	84,504,417	81,198,474
1882	92,411,835	89,207,549
1883	90,313,612	84,639,212
1884	84,975,954	81,633,835
1885	90,181,260	87,311,382
1886	103,011,761	100,160,222
1887	104,645,959	103,327,770
1888	114,341,592	112,665,569
1889	127,677,836	126,723,384
1890	127,166,410	126,804,855
1891	118,237,441	117,946,565
1892	111,531,700	111,259,508
1893	104,081,591	103,827,623
1894	105,113,489	104,844,112
1895	118,164,642	117,896,988
1896	126,289,536	121,949,536
1897	153,435,469	142,853,469
1898	177,022,666	159,359,466
1899	203,541,907	179,678,966
1900	229,315,427	199,017,617

The net products of the States and Territories west of the Missouri River, exclusive of British Columbia and Yukon territory, divided, are as follows:

Year.	Lead.	Copper.	Silver.	Gold.
1870	\$1,080,000	.....	\$17,320,000	\$33,750,000
1871	2,100,000	.....	19,286,000	34,398,000
1872	2,250,000	.....	19,924,429	38,177,395
1873	3,450,000	.....	27,483,302	39,206,558
1874	3,800,000	.....	29,699,122	38,466,488
1875	5,100,000	.....	31,635,239	39,968,194
1876	5,040,000	.....	39,292,924	42,886,935
1877	5,085,250	.....	45,846,109	44,880,223
1878	3,452,000	.....	37,248,137	37,576,030
1879	4,185,769	.....	37,032,857	31,470,262
1880	5,742,390	\$898,000	38,033,055	32,559,067
1881	6,361,902	1,195,000	42,987,613	30,653,959
1882	8,008,155	4,055,037	48,133,039	29,011,318
1883	8,163,550	5,683,921	42,975,101	27,816,640
1884	6,834,091	6,086,252	43,529,925	25,183,567
1885	8,562,991	7,838,036	44,516,599	26,393,756
1886	9,185,192	9,276,755	52,136,851	29,561,424
1887	9,631,073	10,362,746	50,833,884	32,500,067
1888	11,263,630	18,261,490	53,152,747	29,987,702
1889	14,593,323	14,793,763	64,808,637	32,527,661
1890	11,509,571	20,569,092	62,930,831	31,795,361
1891	12,385,780	13,261,603	60,614,004	31,685,118
1892	11,433,947	19,370,516	50,607,601	29,847,444
1893	7,756,040	23,631,339	38,491,521	33,948,723
1894	8,223,513	22,276,294	28,721,014	45,623,291
1895	7,170,367	27,052,115	35,274,777	48,399,729
1896	6,536,026	28,713,305	33,684,963	53,015,242
1897	8,775,144	36,388,694	34,034,034	63,655,597
1898	11,894,251	45,897,648	35,081,365	66,486,202
1899	13,667,248	58,849,994	34,594,498	72,567,226
1900	16,552,408	68,056,534	38,652,502	75,756,173

The exports of silver during the past year to Japan, China, the Straits, etc., have been as follows: From London, \$53,091,033; from San Francisco, \$9,434,690. Total, \$62,525,723, as against \$39,886,795 last year. Pounds sterling estimated at \$4.8665.

STATEMENT OF THE PRODUCT OF GOLD AND SILVER IN THE REPUBLIC OF MEXICO,
REVISED AND CORRECTED FROM 1877 TO 1900 (VALUES UPON MINTAGE BASIS).

Year.	Gold.	Silver.	Total.
1877-78	\$747,000	\$24,837,000	\$25,584,000
1878-79	881,000	25,125,000	26,006,000
1879-80	942,000	26,800,000	27,742,000
1880-81	1,013,000	29,234,000	30,247,000
1881-82	937,000	29,329,000	30,266,000
1882-83	956,000	29,569,000	30,525,000
1883-84	1,055,000	31,695,000	32,750,000
1884-85	914,000	33,226,000	34,140,000
1885-86	1,026,000	34,112,000	35,138,000
1886-87	1,047,000	34,600,000	35,647,000
1887-88	1,031,000	34,912,000	35,943,000
1888-89	1,040,000	40,706,000	41,746,000
1889-90	1,100,000	41,500,000	42,600,000
1890-91	1,150,000	43,000,000	44,150,000
1891-92	1,275,000	45,750,000	47,025,000
1892-93	1,400,000	48,500,000	49,900,000
1893-94	1,425,000	47,250,000	48,675,000
1894-95	4,750,000	54,225,000	58,975,000
1895-96	5,475,000	54,450,000	59,925,000
1896-97	8,500,000	60,683,000	69,183,000
1897-98	9,925,000	67,525,000	77,450,000
1898-99	10,112,000	65,310,000	75,422,000
1899-1900	9,750,000	67,800,000	77,550,000
Total	66,451,000	970,138,000	1,036,589,000

EXHIBIT OF COINAGE OF GOLD, SILVER, AND COPPER IN THE REPUBLIC OF MEXICO
FROM THE 1ST OF JULY, 1873, TO THE 30TH OF JUNE, 1900.

Year.	Gold dollars.	Silver dol- lars.	Copper dol- lars.
1873-74.....	866,743	18,846,067	15,966
1874-75.....	862,619	19,386,958	21,712
1875-76.....	809,401	19,454,054	30,654
1876-77.....	695,750	21,415,128	9,035
1877-78.....	691,998	22,084,203	41,364
1878-79.....	658,206	22,162,987	16,300
1879-80.....	521,826	24,018,528	14,035
1880-81.....	492,068	24,617,395	42,258
1881-82.....	452,590	25,146,260	11,972
1882-83.....	407,600	24,083,921	.....
1883-84.....	328,698	25,377,379	.....
1884-85.....	423,250	25,840,728	.....
1885-86.....	425,000	25,850,000	.....
1886-87.....	410,000	25,600,000	.....
1887-88.....	340,320	26,711,000	.....
1888-89.....	305,100	25,274,500	.....
1889-90.....	243,298	24,328,326	.....
1890-91.....	308,000	24,238,000	.....
1891-92.....	291,940	25,527,000	.....
1892-93.....	361,672	27,169,876	.....
1893-94.....	553,978	30,185,611	.....
1894-95.....	545,237	27,628,981	.....
1895-96.....	565,786	22,634,788	.....
1896-97.....	453,474	19,296,009	.....
1897-98.....	459,219	21,427,057	.....
1898-99.....	715,882	20,184,117	.....
1899-1900.....	598,086	18,102,630	.....
Total	13,787,741	636,591,503	203,296

SUMMARY.—Totals: Gold, \$13,787,741; silver, \$636,591,503; copper, \$203,296.
Grand total, \$650,582,540.

EXHIBIT OF THE COINAGE OF MEXICO FROM THE ESTABLISHMENT OF THE MINTS IN
1537 TO THE END OF THE FISCAL YEAR OF 1900.

	Gold.	Silver.	Copper.	Total.
COLONIAL EPOCH.				
Unmilled coin, from 1537 to 1731.....	\$8,497,950	\$752,067,456	\$200,000	\$760,765,406
Pillar coin, 1732 to 1771.....	19,889,014	441,629,211	.....	461,518,225
Bust coin, 1772 to 1821.....	40,391,447	888,563,989	342,893	929,298,329
Total.....	68,778,411	2,082,260,656	542,893	2,151,581,960
INDEPENDENCE.				
Iturbide's imperial bust, from 1822 to 1823....	557,392	18,575,569	.....	19,132,961
Republic eagle, 1824 to June 30, 1873.....	45,040,628	740,246,485	5,235,177	790,522,290
Total.....	45,598,020	758,822,054	5,235,177	809,655,251
REPUBLIC.				
Eagle coin, from July 1, 1873, to June 30, 1900.	13,787,741	636,591,503	203,296	650,582,540

SUMMARY.—Colonial epoch, from 1537 to 1821, \$2,151,581,960; independence, from 1822 to 1873, \$809,655,251; Republic, from 1873 to 1900, \$650,582,540. Total, \$3,611,819,751.

XVIII.—HIGHEST, LOWEST, AND AVERAGE PRICE OF BAR SILVER IN LONDON, PER OUNCE BRITISH STANDARD (.925), SINCE 1833, AND THE EQUIVALENT IN UNITED STATES GOLD COIN OF AN OUNCE 1,000 FINE, TAKEN AT THE AVERAGE PRICE.

Calendar years.	Highest quotation.	Lowest quotation.	Average quotation.	Value of a fine ounce at average quotation.	Calendar years.	Highest quotation.	Lowest quotation.	Average quotation.	Value of a fine ounce at average quotation.
	<i>d.</i>	<i>d.</i>	<i>d.</i>	<i>Dollars.</i>		<i>d.</i>	<i>d.</i>	<i>d.</i>	<i>Dollars.</i>
1833.....	59 $\frac{1}{2}$	58 $\frac{1}{2}$	59 $\frac{3}{4}$	1.297	1867.....	61 $\frac{1}{2}$	60 $\frac{3}{4}$	60 $\frac{9}{16}$	1.328
1834.....	60 $\frac{1}{2}$	59 $\frac{1}{2}$	59 $\frac{1}{2}$	1.313	1868.....	61 $\frac{1}{8}$	60 $\frac{1}{8}$	60 $\frac{1}{8}$	1.326
1835.....	60	59 $\frac{1}{2}$	59 $\frac{1}{2}$	1.308	1869.....	61	60	60 $\frac{1}{8}$	1.325
1836.....	60 $\frac{1}{2}$	59 $\frac{1}{2}$	60	1.315	1870.....	60 $\frac{1}{2}$	60 $\frac{1}{4}$	60 $\frac{9}{16}$	1.328
1837.....	60 $\frac{1}{2}$	59	59 $\frac{9}{16}$	1.305	1871.....	61	60 $\frac{3}{8}$	60 $\frac{1}{2}$	1.326
1838.....	60 $\frac{1}{2}$	59 $\frac{1}{2}$	59 $\frac{1}{2}$	1.304	1872.....	61 $\frac{1}{8}$	59 $\frac{1}{4}$	60 $\frac{5}{16}$	1.322
1839.....	60 $\frac{1}{2}$	60	60 $\frac{1}{8}$	1.323	1873.....	59 $\frac{1}{8}$	57 $\frac{1}{2}$	59 $\frac{3}{8}$	1.29769
1840.....	60 $\frac{1}{2}$	60 $\frac{1}{8}$	60 $\frac{1}{8}$	1.323	1874.....	59 $\frac{1}{8}$	57 $\frac{1}{4}$	58 $\frac{1}{8}$	1.27883
1841.....	60 $\frac{1}{2}$	59 $\frac{1}{2}$	60 $\frac{1}{8}$	1.316	1875.....	57 $\frac{1}{2}$	55 $\frac{1}{2}$	56 $\frac{1}{8}$	1.24233
1842.....	60	59 $\frac{1}{2}$	59 $\frac{1}{2}$	1.303	1876.....	58 $\frac{1}{2}$	46 $\frac{1}{2}$	53 $\frac{1}{8}$	1.16414
1843.....	59 $\frac{1}{2}$	59	59 $\frac{1}{2}$	1.297	1877.....	58 $\frac{1}{2}$	53 $\frac{1}{4}$	54 $\frac{1}{8}$	1.20189
1844.....	59 $\frac{1}{2}$	59 $\frac{1}{2}$	59 $\frac{1}{2}$	1.304	1878.....	55 $\frac{1}{4}$	49 $\frac{1}{2}$	52 $\frac{1}{8}$	1.13358
1845.....	59 $\frac{1}{2}$	58 $\frac{1}{2}$	59 $\frac{1}{2}$	1.298	1879.....	53 $\frac{1}{4}$	58	51 $\frac{1}{2}$	1.12392
1846.....	60 $\frac{1}{2}$	59	59 $\frac{1}{2}$	1.300	1880.....	52 $\frac{1}{2}$	51 $\frac{1}{2}$	52 $\frac{1}{4}$	1.14507
1847.....	60 $\frac{1}{2}$	58 $\frac{1}{2}$	59 $\frac{1}{2}$	1.308	1881.....	52 $\frac{1}{2}$	50 $\frac{1}{2}$	51 $\frac{1}{8}$	1.13229
1848.....	60	58 $\frac{1}{2}$	59 $\frac{1}{2}$	1.304	1882.....	52 $\frac{1}{2}$	50	51 $\frac{1}{8}$	1.13562
1849.....	60	59 $\frac{1}{2}$	59 $\frac{1}{2}$	1.309	1883.....	51 $\frac{3}{8}$	50 $\frac{1}{8}$	50 $\frac{1}{8}$	1.10874
1850.....	61 $\frac{1}{2}$	59 $\frac{1}{2}$	61 $\frac{1}{8}$	1.316	1884.....	51 $\frac{3}{8}$	49 $\frac{1}{2}$	50 $\frac{1}{8}$	1.11068
1851.....	61 $\frac{1}{2}$	60	61	1.337	1885.....	50	46 $\frac{1}{2}$	48 $\frac{1}{8}$	1.06510
1852.....	61 $\frac{1}{2}$	59 $\frac{1}{2}$	60 $\frac{1}{2}$	1.326	1886.....	47	42	45 $\frac{1}{8}$	.99467
1853.....	61 $\frac{1}{2}$	60 $\frac{1}{2}$	61 $\frac{1}{2}$	1.348	1887.....	47 $\frac{1}{2}$	43 $\frac{1}{4}$	44 $\frac{1}{8}$	.97946
1854.....	61 $\frac{1}{2}$	60 $\frac{1}{2}$	61 $\frac{1}{2}$	1.348	1888.....	44 $\frac{1}{2}$	41 $\frac{1}{2}$	42 $\frac{1}{2}$	.93974
1855.....	61 $\frac{1}{2}$	60	61 $\frac{1}{2}$	1.344	1889.....	44 $\frac{1}{2}$	41 $\frac{1}{2}$	42 $\frac{1}{2}$	.93511
1856.....	62 $\frac{1}{2}$	60 $\frac{1}{2}$	61 $\frac{1}{2}$	1.344	1890.....	54 $\frac{1}{2}$	43 $\frac{1}{2}$	47 $\frac{1}{2}$	1.04634
1857.....	62 $\frac{1}{2}$	61	61 $\frac{1}{2}$	1.353	1891.....	48 $\frac{1}{2}$	43 $\frac{1}{2}$	45 $\frac{1}{2}$	.98800
1858.....	61 $\frac{1}{2}$	60 $\frac{1}{2}$	61 $\frac{1}{2}$	1.344	1892.....	43 $\frac{1}{2}$	37 $\frac{1}{2}$	39 $\frac{1}{2}$	.87145
1859.....	62 $\frac{1}{2}$	61 $\frac{1}{2}$	62 $\frac{1}{2}$	1.360	1893.....	38 $\frac{1}{2}$	30 $\frac{1}{2}$	35 $\frac{1}{2}$	.78030
1860.....	62 $\frac{1}{2}$	61 $\frac{1}{2}$	61 $\frac{1}{2}$	1.352	1894.....	31 $\frac{1}{2}$	27	28 $\frac{1}{2}$	.63479
1861.....	61 $\frac{1}{2}$	60 $\frac{1}{2}$	60 $\frac{1}{2}$	1.333	1895.....	31 $\frac{1}{2}$	27 $\frac{3}{4}$	29 $\frac{1}{2}$	.65406
1862.....	62 $\frac{1}{2}$	61	61 $\frac{1}{2}$	1.346	1896.....	31 $\frac{1}{2}$	29 $\frac{1}{2}$	30 $\frac{1}{2}$	.67565
1863.....	61 $\frac{1}{2}$	61	61 $\frac{1}{2}$	1.345	1897.....	29 $\frac{1}{2}$	23 $\frac{1}{2}$	27 $\frac{1}{2}$	.60438
1864.....	62 $\frac{1}{2}$	60 $\frac{1}{2}$	61 $\frac{1}{2}$	1.345	1898.....	28 $\frac{1}{2}$	25	26 $\frac{1}{2}$	.59010
1865.....	61 $\frac{1}{2}$	60 $\frac{1}{2}$	61 $\frac{1}{2}$	1.338	1899.....	29	26 $\frac{1}{2}$	27 $\frac{1}{2}$	.60154
1866.....	62 $\frac{1}{2}$	60 $\frac{1}{2}$	61 $\frac{1}{2}$	1.339	1900.....	30 $\frac{1}{4}$	27	28 $\frac{1}{2}$	.62007

XIX.—COMMERCIAL RATIO OF SILVER TO GOLD EACH YEAR SINCE 1687.

[NOTE.—From 1687 to 1832 the ratios are taken from Dr. A. Soetbeer; from 1833 to 1878 from Pixley and Abell's tables; and from 1879 to 1896 from daily cablegrams from London to the Bureau of the Mint.]

Years.	Ratio.	Years.	Ratio.	Years.	Ratio.	Years.	Ratio.	Years.	Ratio.	Years.	Ratio.
1687....	14.94	1723....	15.20	1759....	14.15	1795....	15.55	1831....	15.72	1867....	15.57
1688....	14.94	1724....	15.11	1760....	14.14	1796....	15.65	1832....	15.73	1868....	15.59
1689....	15.02	1725....	15.11	1761....	14.54	1797....	15.41	1833....	15.93	1869....	15.60
1690....	15.02	1726....	15.15	1762....	15.27	1798....	15.59	1834....	15.73	1870....	15.57
1691....	14.98	1727....	15.24	1763....	14.99	1799....	15.74	1835....	15.80	1871....	15.57
1692....	14.92	1728....	15.11	1764....	14.70	1800....	15.68	1836....	15.72	1872....	15.63
1693....	14.83	1729....	14.92	1765....	14.83	1801....	15.46	1837....	15.83	1873....	15.93
1694....	14.87	1730....	14.81	1766....	14.80	1802....	15.26	1838....	15.85	1874....	16.16
1695....	15.02	1731....	14.94	1767....	14.85	1803....	15.41	1839....	15.62	1875....	16.64
1696....	15.00	1732....	15.09	1768....	14.80	1804....	15.41	1840....	15.62	1876....	17.75
1697....	15.20	1733....	15.18	1769....	14.72	1805....	15.79	1841....	15.70	1877....	17.20
1698....	15.07	1734....	15.39	1770....	14.62	1806....	15.52	1842....	15.87	1878....	17.92
1699....	14.94	1735....	15.41	1771....	14.66	1807....	15.43	1843....	15.93	1879....	18.39
1700....	14.81	1736....	15.18	1772....	14.52	1808....	16.08	1844....	15.85	1880....	18.05
1701....	15.07	1737....	15.02	1773....	14.62	1809....	15.96	1845....	15.92	1881....	18.25
1702....	15.52	1738....	14.91	1774....	14.62	1810....	15.77	1846....	15.90	1882....	18.20
1703....	15.17	1739....	14.91	1775....	14.72	1811....	15.53	1847....	15.80	1883....	18.64
1704....	15.22	1740....	14.94	1776....	14.55	1812....	16.11	1848....	15.85	1884....	18.61
1705....	15.11	1741....	14.92	1777....	14.54	1813....	16.25	1849....	15.78	1885....	19.41
1706....	15.27	1742....	14.85	1778....	14.68	1814....	15.04	1850....	15.70	1886....	20.78
1707....	15.44	1743....	14.85	1779....	14.80	1815....	15.26	1851....	15.46	1887....	21.10
1708....	15.41	1744....	14.87	1780....	14.72	1816....	15.28	1852....	15.59	1888....	22.00
1709....	15.31	1745....	14.98	1781....	14.78	1817....	15.11	1853....	15.33	1889....	22.10
1710....	15.22	1746....	15.13	1782....	14.42	1818....	15.35	1854....	15.33	1890....	19.75
1711....	15.29	1747....	15.26	1783....	14.48	1819....	15.33	1855....	15.38	1891....	20.92
1712....	15.31	1748....	15.11	1784....	14.70	1820....	15.62	1856....	15.38	1892....	23.72
1713....	15.24	1749....	14.80	1785....	14.92	1821....	15.95	1857....	15.27	1893....	26.49
1714....	15.13	1750....	14.55	1786....	14.96	1822....	15.80	1858....	15.38	1894....	32.56
1715....	15.11	1751....	14.39	1787....	14.92	1823....	15.84	1859....	15.19	1895....	31.60
1716....	15.09	1752....	14.54	1788....	14.65	1824....	15.82	1860....	15.29	1896....	30.59
1717....	15.13	1753....	14.54	1789....	14.75	1825....	15.70	1861....	15.50	1897....	34.20
1718....	15.11	1754....	14.48	1790....	15.04	1826....	15.76	1862....	15.35	1898....	35.03
1719....	15.09	1755....	14.68	1791....	15.05	1827....	15.74	1863....	15.37	1899....	34.36
1720....	15.04	1756....	14.94	1792....	15.17	1828....	15.78	1864....	15.37	1900....	33.33
1721....	15.05	1757....	14.87	1793....	15.00	1829....	15.78	1865....	15.44		
1722....	15.17	1758....	14.85	1794....	15.37	1830....	15.82	1866....	15.43		

XX.—IMPORTS OF GOLD AND SILVER, BY CUSTOMS

[Compiled by the

Customs districts.	GOLD.					
	Gold con- tained in ore.	Bullion.		Coin.		Total gold.
				United States.	Foreign.	
	<i>Dollars.</i>	<i>Ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Bangor, Me		891	17,540			17,540
Boston and Charlestown, Mass ..	3,840	3,229	63,520	2,400	24,333	94,093
Charleston, S. C					333	333
Newark, N. J	53,029					53,029
New York, N. Y	871,473	^a 331,900	6,811,759	1,636,755	1,973,004	11,292,991
Passamaquoddy, Me		14,294	289,633			289,633
Perth Amboy, N. J	60,787					60,787
Philadelphia, Pa				10	9,247	9,257
Brazos de Santiago, Tex						
Corpus Christi, Tex	12,933	80,798	1,683,612	159,607		1,856,152
Mobile, Ala				6,030	202	6,232
New Orleans, La		15,350	282,575	15,935		298,510
Paso del Norte, Tex	292,422	29	577			292,999
Saluria, Tex		8,556	165,950			165,950
Alaska	14,834,574	78,207	1,262,393		9,176	16,106,143
Arizona	128,504	56,041	1,120,182			1,248,686
Los Angeles, Cal	50					50
Puget Sound, Wash	3,394,679	66,720	971,316	75,067		4,441,062
San Diego, Cal	5,720	4,019	60,290	4,000		70,010
San Francisco, Cal	133,773	16,807	361,248	465,020	24,042,248	25,002,289
Buffalo Creek, N. Y		20,001	355,369			355,369
Champlain, N. Y		4,736	80,270	2,650,466	866,252	3,596,988
Chicago, Ill	377,612				3,092	380,704
Detroit, Mich		14	245			245
Huron, Mich						
Minnesota, Minn	13,682					13,682
Montana and Idaho						
Niagara, N. Y	1,118	5,170	99,390	95,000	4,867	200,375
North and South Dakota						
Oswegatchie, N. Y	860,047					860,047
Vermont, Vt	442	1,911	32,593		1,750	34,785
Denver, Colo	1,143					1,143
Omaha, Nebr						
Total	21,045,828	708,673	13,658,462	5,110,290	26,934,504	66,749,084

^a Includes ounces 155,896, \$3,211,444 United States mint or assay office bars.

DISTRICTS, DURING THE CALENDAR YEAR 1900.

Bureau of Statistics.]

SILVER.					
Silver contained in ore.	Bullion.		Coin.		Total silver.
			United States.	Foreign.	
<i>Dollars.</i>	<i>Ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
			51	2,433	2,484
112,658					112,658
13,799,147	5,479,428	3,287,752	45,683	613,943	17,746,525
1,308,844					1,308,844
				486	486
442,595	257,209	158,012		23,253	23,253
				130,933	731,540
			546	5,875	6,421
			1,931	197,596	199,527
5,976,544	1,650,096	941,570		4,825,489	11,743,603
318	1,601,090	799,504		26,180	826,002
734,020	864,709	497,172			1,231,192
582,680			48,142		630,822
452,102	3,247,400	2,285,782	20,393	695,094	3,453,371
	3,550	1,813			1,813
422,072			29,879		29,879
				40	422,112
	1,305	664	2,250		2,250
					664
939,214					939,214
409	23,383	14,132	7,100		21,641
320,238			28,017		348,255
190,776					190,776
	3,977	2,398	1,852		4,250
79,761					79,761
43,000					43,000
25,404,378	13,132,147	7,988,799	185,844	6,521,322	40,100,343

XXI.—IMPORTS OF GOLD AND SILVER, BY COUN

[Compiled by the

Countries.	GOLD.					
	Gold contained in ore.	Bullion.		Coin.		Total gold.
				United States.	Foreign.	
	<i>Dollars.</i>	<i>Ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Azores, and Madeira Islands.....				32,970	3,197	36,167
France.....				1,000,000	788,562	1,788,562
Germany.....		4,038	83,197	19,010	654,135	756,342
United Kingdom.....	69,588	^a 291,192	5,972,577	246,822	325,771	6,614,758
British Honduras.....		325	5,868	17,000		22,868
Dominion of Canada:						
Nova Scotia, New Brunswick, etc.....	3,840	18,414	370,693	2,400		376,933
Quebec, Ontario, etc.....	1,833,541	31,311	557,404	2,745,466	872,869	6,009,280
British Columbia.....	17,687,754	152,001	2,384,972	75,067	9,176	20,156,969
Newfoundland and Labrador.....				174	132	306
Central American States:						
Costa Rica.....		5,151	107,290	5,460	1,000	113,750
Guatemala.....	540	410	8,406	17,095	4,166	30,207
Honduras.....		4,162	83,919	2,045	333	86,297
Nicaragua.....		16,014	299,095	9,513		308,608
Salvador.....		33	719	3,600		4,319
Mexico.....	1,448,644	165,307	3,365,481	244,151	13,020	5,071,296
West Indies:						
British.....		1,310	27,059	96,776	35,029	158,864
Cuba.....		82	1,700		161,784	163,484
Danish.....				45,810	4,564	50,374
Dutch.....		70	1,477	18,265	4,211	23,953
Haiti.....		34	700	74,975		75,675
Porto Rico.....		60	1,243	1,645		2,888
Santo Domingo.....		16	329	10,725	4,721	15,775
Brazil.....				3,100		3,100
Chile.....	1,143	508	10,476	625		12,244
Colombia.....		13,940	287,187	17,783	18,554	323,524
Ecuador.....		3,620	74,629			74,629
Guianas—British.....		6	129			129
Dutch.....		250	5,164	3,000		8,164
Peru.....		52	1,165			1,165
Venezuela.....		367	7,583	49,079	3,000	59,662
China.....					3,000	3,000
Hongkong.....	778					778
Japan.....				2,964	6,944,530	6,947,494
British Australasia.....				5,630	17,082,750	17,088,380
German Oceania.....						
Hawaii.....				359,140		359,140
Total.....	21,045,828	708,673	13,658,462	5,110,290	26,934,504	66,749,084

^a Includes ounces 155,896, \$3,211,444 United States mint or assay office bars.

TRIES, DURING THE CALENDAR YEAR 1900.

Bureau of Statistics.]

SILVER.					
Silver contained in ore.	Bullion.		Coin.		Total silver.
			United States.	Foreign.	
<i>Dollars.</i>	<i>Ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
.....	.....	.....	470	.....	470
.....	.....	.....	.....	2,595	2,595
.....					
59,514	6,553	3,933	622	6,609	70,678
.....	.....	.....	166	166,903	167,069
.....					
.....	.....	.....	866	.....	866
35,000	12,832	7,075	69,098	.....	111,173
2,498,711	19,383	11,932	48,142	.....	2,558,785
.....	.....	.....	1,540	721	2,261
.....					
.....	518,892	311,456	453	88,576	400,485
.....	3,671	2,203	377	33,075	35,655
1,798	494,300	296,581	1,943	32,467	332,789
.....	1,666	1,000	.....	29,473	30,473
.....	2,300	1,500	.....	3,542	5,042
20,485,127	11,135,522	6,790,901	1,498	5,801,140	33,078,666
.....					
.....	333	200	10,344	6,561	16,905
.....	.....	.....	3	.....	203
.....	.....	.....	9,314	2,585	11,899
.....	1,038	623	1,075	1,388	3,086
.....	.....	.....	.....	10,150	10,150
.....					
.....	.....	.....	18,705	92,578	111,283
.....					
2,194,509	746,289	447,774	.....	2,817	2,645,100
15,465	189,043	113,426	121	144,331	273,343
.....					
.....	.....	.....	.....	87,593	87,593
.....					
114,245	325	195	.....	.....	114,440
.....	.....	.....	714	220	934
.....	.....	.....	.....	4,845	4,845
9	.....	.....	.....	.....	9
.....	.....	.....	20,393	2,325	22,718
.....					
.....	.....	.....	.....	828	828
.....					
25,404,378	13,132,147	7,988,799	185,844	6,521,322	40,100,343

XXII.—EXPORTS, BY CUSTOMS DISTRICTS AND COUNTRIES, OF DOMESTIC GOLD

[Compiled by the

Customs districts and countries.	GOLD.						
	Gold contained in ore.	Bullion.				Coin.	Total gold.
		United States mint or assay office bars.		Other.			
CUSTOMS DISTRICTS.	Dollars.	Ounces.	Dollars.	Ounces.	Dollars.	Dollars.	Dollars.
Bangor, Me							
Boston and Charlestown, Mass						15,000	15,000
New York, N. Y.	51,153	1,693,933	34,568,510			12,061,811	46,681,474
Philadelphia, Pa.						5,000	5,000
Mobile, Ala.						10,000	10,000
Saluria, Tex.							
Alaska	1,800						1,800
Hawaii.						41,596	41,596
Puget Sound, Wash.	16,930			6	121	15,323	32,374
San Francisco, Cal.		264	5,740			465,117	470,857
Buffalo Creek, N. Y.				1,141	23,494		23,494
Champlain, N. Y.						4,608,918	4,608,918
Memphremagog, Vt.						205	205
Niagara, N. Y.				4,707	93,688	602,640	696,328
Vermont, Vt.	43			22	434	200,000	200,477
Total	69,926	1,694,197	34,574,250	5,876	117,737	18,025,610	52,787,523
COUNTRIES.							
France		748,266	15,182,481			1,900,000	17,082,481
Germany	19,280	226,267	4,600,709			500,000	5,119,989
Netherlands						2,000	2,000
United Kingdom	31,873	719,244	14,782,320			4,152,400	18,966,593
Dominion of Canada:							
Nova Scotia, New Brunswick, etc.							
Quebec, Ontario, etc.	43			5,870	117,616	5,411,763	5,529,422
British Columbia	18,730			6	121	15,323	34,174
Central American States:							
Costa Rica						5,750	5,750
Guatemala						5,300	5,300
Honduras						3,000	3,000
Nicaragua						600	600
Salvador						16,335	16,335
Mexico		156	3,000			70,905	73,905
Miquelon, Langley, etc.						10,000	10,000
West Indies:							
British						115,385	115,385
Cuba						54,000	54,000
Dutch						17,110	17,110
Haiti						556,578	556,578
Santo Domingo						712,196	712,196
Argentina						2,460,000	2,460,000
Colombia						38,897	38,897
Ecuador						100	100
Guianas—British							
Dutch							
Venezuela						1,491,490	1,491,490
China		75	1,600				1,600
Hongkong		189	4,140			202,332	206,472
Japan							
British Australasia						8,116	8,116
Hawaii						276,030	276,030
Total	69,926	1,694,197	34,574,250	5,876	117,737	18,025,610	52,787,523

AND SILVER FROM THE UNITED STATES DURING THE CALENDAR YEAR 1900.
Bureau of Statistics.]

SILVER.						
Silver con- tained in ore.	Bullion.				Coin.	Total silver.
	United States mint or assay office bars.		Other.			
<i>Dollars.</i>	<i>Ounces.</i>	<i>Dollars.</i>	<i>Ounces.</i> 31	<i>Dollars.</i> 23	<i>Dollars.</i>	<i>Dollars.</i> 23
515,755			85,448,982	52,608,544	335,045	53,459,344
			825	500		500
			2,081,316	1,130,000	31,843	1,161,843
			7,400,260	4,499,436	59,250	4,558,686
			53,909	31,397		31,397
					10,658	10,658
			374	250		250
			62,205	36,829	5,955	42,784
			11,881	7,176	7	7,183
515,755			95,059,783	58,314,155	442,758	59,272,668
42,636			1,201,238	736,562	1,000	737,562
					500	43,136
473,119			84,245,812	51,870,790		52,343,909
			31	23		23
			128,369	75,652	16,620	92,272
					31,843	31,843
			825	500		500
					8,875	8,875
					21,623	21,623
					3	3
					5,000	5,000
					298,044	298,044
			300	192		192
			1,632	1,000		1,000
			4,342,367	2,473,742		2,473,742
			5,058,909	3,105,894		3,105,894
			80,300	49,800		49,800
					59,250	59,250
515,755			95,059,783	58,314,155	442,758	59,272,668

XXIII.—EXPORTS, BY CUSTOMS DISTRICTS AND COUNTRIES, OF FOREIGN GOLD

[Compiled by the

Customs districts and countries.	GOLD.				
	Gold contained in ore.	Bullion.		Coin.	Total gold.
CUSTOMS DISTRICTS.	Dollars.	Ounces.	Dollars.	Dollars.	Dollars.
Baltimore, Md.....					
New York, N. Y.....				1,100,173	1,100,173
Brazos de Santiago, Tex.....					
Corpus Christi, Tex.....					
New Orleans, La.....					
San Francisco, Cal.....					
Champlain, N. Y.....				193,704	193,704
Detroit, Mich.....				48,873	48,873
Memphremagog, Vt.....		1	12		12
Vermont, Vt.....		50	838	3,500	4,338
Total.....		51	850	1,346,250	1,347,100
COUNTRIES.					
France.....				77,000	77,000
Germany.....				2,280	2,280
United Kingdom.....					
Bermuda.....				146,175	146,175
Dominion of Canada:					
Quebec, Ontario, etc.....		51	850	246,077	246,927
Central American States:					
Guatemala.....					
Honduras.....					
Nicaragua.....					
Salvador.....					
Mexico.....					
West Indies:					
British.....					
Cuba.....				866,616	866,616
Santo Domingo.....				4,249	4,249
Brazil.....					
Colombia.....					
Guianas—British.....					
Venezuela.....				3,853	3,853
Hongkong.....					
Japan.....					
French Oceania.....					
Total.....		51	850	1,346,250	1,347,100

AND SILVER FROM THE UNITED STATES DURING THE CALENDAR YEAR 1900.

Bureau of Statistics.]

SILVER.				
Silver contained in ore.	Bullion.		Coin.	Total silver.
<i>Dollars.</i>	<i>Ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
			1,000	1,000
			1,693,000	1,693,000
			10,472	10,472
			17,620	17,620
			19,930	19,930
			5,028,329	5,028,329
			53,903	53,903
			78,577	78,577
	60	38		38
			46,127	46,127
	60	38	6,948,958	6,948,996
			4,931	4,931
			1,563,650	1,563,650
	60	38	178,607	178,645
			2,300	2,300
			41,400	41,400
			19,930	19,930
			17,867	17,867
			30,592	30,592
			25,769	25,769
			5,622	5,622
			31,680	31,680
			1,365	1,365
			3,916	3,916
			1,000	1,000
			5,002,612	5,002,612
			16,437	16,437
			1,280	1,280
	60	38	6,948,958	6,948,996

XXIV.—SUMMARY OF IMPORTS AND EXPORTS OF GOLD AND SILVER DURING THE
CALENDAR YEAR 1900.

[Compiled by the Bureau of Statistics.]

Kind of coin and bullion.	Imports.	Exports.		
		Domestic.	Foreign.	Total.
GOLD.				
Ore	\$21, 045, 828	\$69, 926	.....	\$69, 926
Bullion	13, 658, 462	34, 691, 987	\$850	34, 692, 837
Coin:				
United States	5, 110, 290	18, 025, 610	.....	18, 025, 610
Foreign	26, 934, 504	.....	1, 346, 250	1, 346, 250
Total.....	66, 749, 084	52, 787, 523	1, 347, 100	54, 134, 623
SILVER.				
Ore	25, 404, 378	515, 755	.....	515, 755
Bullion	7, 988, 799	58, 314, 155	38	58, 314, 193
Coin:				
United States	185, 844	442, 758	.....	442, 758
Foreign	6, 521, 322	.....	6, 948, 958	6, 948, 958
Total.....	40, 100, 343	59, 272, 668	6, 948, 996	66, 221, 664
Total gold and silver	106, 849, 427	112, 060, 191	8, 296, 096	120, 356, 287

XXV.—COINAGE OF NATIONS.

Countries.	1898.		1899.		1900.	
	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.
United States	\$77,985,758	\$23,034,033	\$111,344,220	\$26,061,520	\$99,272,943	\$36,345,321
Mexico	599,442	22,066,445	676,063	18,749,740	568,825	17,097,050
Great Britain	28,204,336	6,200,237	43,852,085	7,910,885	63,769,609	10,107,818
Australasia	39,453,387		46,926,487		48,782,482	
India		^a 26,686,134		^b 7,221,063		^b 65,482,993
France	31,224,022	7,720,000	10,419,111	5,211,000	5,799,424	1,099,421
Germany	42,675,087	3,704,600	33,628,453	4,346,302	34,680,396	5,645,281
Russia ^c	135,788,949	21,373,189	194,481,077	20,967,769	83,221,525	3,946,971
Austria-Hungary ^d	14,367,363	1,369,352	4,992,663	3,176,050	3,575,517	4,937,839
Liechtenstein	112		9,178	15,322		
Spain			4,863,650	14,884,262	3,188,055	3,804,852
Italy		528,650		485,950		157,767
San Marino		7,720		28,950		
Servia		143,399				
Japan	16,002,641	8,159,857	8,705,377	4,363,709	5,567,128	1,295,850
Portugal		1,100,844		2,754,000		648,000
Netherlands	437,259	562,800	724,452	265,320	804,342	1,236,150
Norway		147,400		160,800		134,000
Sweden	1,680,022	795,072	1,537,641	248,910	558,507	101,517
Denmark	267,046	53,800		136,548	1,082,870	80,788
Belgium		96,500		96,500		
Switzerland	1,544,000	424,600	1,158,000	115,800	1,544,000	147,645
Turkey	1,388,586	442,721	279,871	248,330	342,093	7,852
Arabia		1,022		1,022		2,044
Egypt		856,114				605,544
Abyssinia		401,440		201,724		50
Persia	85,200	5,964,000				
Hongkong		3,150,000		34,596,185		5,450,000
Indo-China		4,589,800		5,733,397		14,620,957
Tunis	579,232	347	579,232	347	579,232	347
Canada		217,000		398,895		589,000
Newfoundland		39,804		100,000		100,000
Costa Rica			698,023	10,000	1,047,041	
Brazil			105,673			
Bolivia		1,348,094		1,941,532		
Peru	195,161	120,000	164,658	165,000	309,183	109,575
Ecuador			964,700	50,000	243,325	23,359
Santo Domingo		1,415,102		240,395		
German East Africa		174,900		73,567		111,183
Straits Settlements		452,000		636,000		800,000
Morocco		606,918		443,120		430,939
Mauritius				9,730		
Ceylon				97,320		97,330
Siam	302	5,329,042		4,080,000		263,473
Cyprus						316,323
British Guiana						3,650
Venezuela						546,003
Dutch East Indies						556,770
Curaçao						48,240
Sarawak						60,000
Total	395,477,905	149,282,936	466,110,614	166,226,964	354,936,497	177,011,902

^a Rupee calculated at coining rate, \$0.4737.^c Ruble calculated at coining rate, \$0.5145.^b Fiscal year 1899-1900 rupee calculated at \$0.3244.^d Florin calculated at coining rate, \$0.4052.

XXVI.—WORLD'S PRODUCTION OF GOLD AND SILVER FOR CALENDAR YEARS 1898, 1899, AND 1900.

[Kilogram of gold, \$664.60; kilogram of silver, \$41.56, coining rate in United States silver dollars. Fine ounce of gold, \$20.67183+; fine ounce of silver, \$1.292929+, coining rate in United States silver dollars.]

1898.

Countries.	GOLD.			SILVER.			
	Kilo-grams (fine).	Ounces (fine).	Value.	Kilo-grams (fine).	Ounces (fine).	Coining value.	Commer- cial value.
North America:							
United States.....	96,995	3,118,398	\$64,463,000	1,693,563	54,438,000	\$70,384,500	\$32,118,400
Mexico.....	12,790	411,187	^a 8,500,000	1,765,116	56,738,000	73,358,200	33,475,400
Canada and New- foundland.....	20,822	^b 669,445	13,838,700	138,512	4,452,333	5,756,500	2,626,900
Africa.....	120,566	3,876,216	80,128,500				
Australasia.....	97,594	3,137,641	64,860,800	326,379	10,491,100	13,564,300	6,189,700
Europe:							
Russia.....	38,314	1,231,791	25,463,400	8,664	278,492	360,100	164,300
Austria-Hungary..	2,798	89,951	1,859,500	56,443	1,814,294	2,345,700	1,070,400
Germany.....	111	3,561	73,600	173,329	5,571,516	7,203,600	3,287,200
Norway.....				5,392	173,327	224,100	102,300
Sweden.....	126	4,044	83,600	2,033	65,345	84,500	38,600
Italy.....	250	8,027	165,900	25,028	804,512	1,040,200	474,700
Spain.....	3	96	2,000	76,295	2,452,940	3,171,500	1,447,200
Portugal.....	7	227	4,700	119	3,790	4,900	2,200
Greece.....				41,950	1,348,411	1,743,400	795,600
Turkey.....	21	675	14,000	4,422	142,141	183,800	83,900
Finland.....	5	149	3,100	456	14,657	19,000	8,600
France.....				14,340	460,946	596,000	272,000
Great Britain.....	10	321	6,600	6,575	211,317	273,300	124,700
South America:							
Argentina.....	207	6,661	^c 137,700	11,930	383,479	495,800	226,300
Bolivia.....	504	16,204	335,000	342,138	10,997,705	14,219,300	6,488,600
Chile.....	1,344	43,229	893,600	147,946	4,754,636	6,117,400	2,805,200
Colombia.....	3,248	104,426	2,158,700	170,598	5,483,748	7,090,100	3,235,400
Ecuador.....	59	1,911	39,500	240	7,734	^a 10,000	4,600
Brazil.....	2,383	76,613	1,583,700				
Venezuela.....	1,639	52,694	1,089,300				
Guiana (British) ..	3,082	99,105	2,048,700				
Guiana (Dutch)....	856	27,532	569,100				
Guiana (French)....	2,474	79,547	1,644,400				
Peru.....	945	^c 30,380	628,000	165,000	5,303,770	6,857,400	3,129,200
Uruguay.....	52	1,664	34,400				
Central America.....	735	23,642	488,700	22,288	716,412	926,300	422,700
Asia:							
Japan.....	1,161	37,336	771,800	60,560	1,946,648	2,516,900	1,148,500
China.....	8,114	260,871	5,392,700				
Korea.....	1,758	56,541	1,168,200				
India (British)....	11,709	376,431	7,781,500				
East Indies (Brit- ish).....	797	25,625	529,700				
East Indies(Dutch)	177	5,689	117,600				
Total.....	431,656	13,877,806	286,879,700	5,259,286	169,055,253	218,576,800	99,742,600

^a Estimate Bureau of the Mint.
^b Newfoundland product for 1897 included.
^c Figures for 1897 repeated.

WORLD'S PRODUCTION OF GOLD AND SILVER FOR CALENDAR YEARS 1898, 1899, AND 1900—Continued.

1899.

Countries.	GOLD.			SILVER.			
	Kilo-grams (fine).	Ounces (fine).	Value.	Kilo-grams (fine).	Ounces (fine).	Coining value.	Commercial value.
North America:							
United States.....	106,911	3,437,210	\$71,053,400	1,703,720	54,764,500	\$70,806,600	\$32,858,700
Mexico.....	12,790	411,187	^a 8,500,000	1,730,089	55,612,090	71,902,500	33,367,300
Canada and Newfoundland.....	32,086	^b 1,031,563	21,324,300	106,136	3,411,644	4,411,000	2,047,000
Africa.....	109,876	3,532,488	73,023,000				
Australasia.....	119,352	3,837,181	79,321,600	396,266	12,737,598	16,468,800	7,642,600
Europe:							
Russia.....	33,354	1,072,333	22,167,100	4,196	134,887	174,400	80,900
Austria-Hungary..	2,925	94,037	1,943,900	58,961	1,895,253	2,450,400	1,137,200
Germany.....	112	3,589	74,200	194,190	6,242,053	8,070,500	3,745,200
Norway.....				5,193	166,908	215,800	100,100
Sweden.....	106	3,414	70,600	2,290	73,619	95,200	44,200
Italy.....	113	3,633	75,100	25,494	819,481	1,059,500	491,700
Spain.....	^c 3	96	2,000	^c 76,295	2,452,940	3,171,500	1,471,800
Portugal.....	^c 7	227	4,700	^c 119	3,790	4,900	2,300
Greece.....				36,659	1,178,369	1,523,500	707,000
Turkey.....	^c 21	675	14,000	^c 4,422	142,141	183,800	85,360
Finland.....	3	84	1,700	244	7,843	10,400	4,700
France.....				14,500	466,089	602,600	279,700
Great Britain.....	88	2,844	58,800	5,804	186,582	241,200	111,900
South America:							
Argentina.....	207	6,661	^d 137,700	11,930	383,479	^d 495,800	230,100
Bolivia.....	500	16,075	332,300	310,500	9,980,731	12,904,400	5,988,400
Chile.....	1,954	62,819	1,298,600	429,503	1,162,718	5,382,100	2,497,600
Colombia.....	2,775	89,231	1,844,600	109,556	3,521,563	4,553,100	2,112,900
Ecuador.....	72	2,317	47,900	240	7,731	^a 10,000	4,600
Brazil.....	3,234	103,983	2,149,500				
Venezuela.....	893	28,710	593,500				
Guiana (British) ..	3,070	98,712	2,040,500				
Guiana (Dutch)...	884	28,423	587,600				
Guiana (French)...	2,541	81,691	1,688,700				
Peru.....	1,295	41,634	860,700	203,000	6,525,245	8,436,700	3,915,100
Uruguay.....	41	1,331	27,500	20	643	800	400
Central America.....	881	28,355	586,100	28,377	912,170	1,179,400	547,300
Asia:							
Japan.....	1,662	53,421	1,104,300	55,608	1,787,463	2,311,100	1,072,500
China.....	8,387	269,662	5,574,400				
Korea.....	2,195	70,579	1,459,000				
India (British)...	13,029	418,869	8,658,800				
East Indies (British).....	640	20,562	425,100				
East Indies (Dutch).....	177	5,689	117,600				
Total.....	462,184	14,859,285	307,168,800	5,213,312	167,577,533	216,665,700	100,546,500

^a Estimate Bureau of the Mint.^b Newfoundland product for 1897 included.^c Figures for 1898 repeated.^d Figures for 1897 repeated.

WORLD'S PRODUCTION OF GOLD AND SILVER FOR CALENDAR YEARS 1898, 1899, AND 1900—Continued.

1900.

Country.	GOLD.			SILVER.			
	Kilo-grams (fine).	Ounces (fine).	Value.	Kilo-grams (fine).	Ounces (fine).	Coining value.	Commer- cial value.
North America:							
United States.....	119,126	3,829,897	\$79,171,000	1,793,395	57,647,000	\$74,533,500	\$35,741,100
Mexico.....	13,542	435,375	^a 9,000,000	1,786,887	57,437,808	74,263,000	35,611,400
Canada.....	41,951	1,348,720	27,880,500	138,400	4,448,755	5,751,900	2,758,200
Africa.....	13,048	419,503	8,671,900				
Australasia.....	110,591	3,555,506	73,498,900	415,014	13,340,263	17,248,000	8,271,000
Europe:							
Russia.....	30,312	974,537	20,145,500	4,458	143,299	185,300	88,800
Austria-Hungary..	3,223	103,615	2,141,900	61,871	1,988,774	2,571,300	1,233,000
Germany.....	99	3,192	66,000	168,350	5,411,441	6,996,600	3,355,100
Norway.....				5,377	172,839	223,500	107,200
Sweden.....	88	2,845	58,800	1,928	61,983	80,100	38,100
Italy.....	53	1,704	35,200	23,374	751,335	971,400	465,800
Spain.....	13	418	8,600	99,095	3,185,316	4,118,400	1,974,900
Portugal.....	37	227	4,700	^c 419	3,790	4,900	2,300
Greece.....				^b 36,659	1,178,369	1,523,500	730,600
Turkey.....	^c 21	675	14,000	^c 4,422	142,144	183,800	88,100
Finland.....	^b 3	84	1,700	^b 244	7,843	40,100	4,900
France.....				^b 14,500	466,089	602,600	289,000
Great Britain.....	415	13,360	276,200	6,896	221,673	286,600	137,400
South America:							
Argentina.....	66	2,112	43,700	1,144	36,774	47,500	22,800
Bolivia.....	^b 500	16,075	332,300	^b 310,500	9,980,731	12,904,400	6,188,100
Chile.....	2,449	78,735	1,627,600	^b 129,503	4,162,718	5,382,100	2,580,900
Colombia.....	1,798	57,804	1,194,900	^c 4,994	1,864,165	2,410,200	1,155,800
Ecuador.....	162	5,208	107,700	240	7,734	^a 10,000	4,800
Brazil.....	5,011	161,104	3,330,300				
Venezuela.....	^b 893	28,710	593,500				
Guiana (British) ..	3,063	98,487	2,035,900				
Guiana (Dutch) ..	867	27,882	576,400				
Guiana (French) ..	2,378	76,468	1,580,700				
Peru.....	1,633	52,498	1,085,200	226,973	7,295,825	9,433,000	4,523,400
Uruguay.....	46	1,492	30,800	25	798	1,000	500
Central America ..	752	24,188	500,000	31,523	1,013,285	1,310,100	628,200
Asia:							
Japan.....	1,662	53,421	^b 1,104,300	55,608	1,787,463	^b 2,311,100	1,108,200
China.....	8,387	269,662	^b 5,574,400				
Korea.....	6,771	217,687	4,500,000				
India (British)	14,197	456,444	9,435,500				
East Indies (Brit- ish).....	860	27,643	571,400				
East Indies(Dutch)	654	21,041	435,000	2,509	80,659	104,300	50,000
Total	384,641	12,366,319	255,634,500	5,377,008	172,838,870	223,468,200	107,159,900

^a Estimate Bureau of the Mint. ^b Figures for 1899 repeated. ^c Figures for 1898 repeated.

XXVII.—COINAGE OF THE MINTS OF THE UNITED STATES FROM THEIR ORGANIZATION, 1792, TO DECEMBER 31, 1900.

Denomination.	Pieces.	Value.
GOLD.		
Double eagles	78,602,853	\$1,572,057,060.00
Eagles	31,906,165	319,061,650.00
Half eagles	52,499,971	262,499,855.00
Three-dollar pieces (coinage discontinued act of Sept. 26, 1890)	539,792	1,619,376.00
Quarter eagles	11,646,347	29,145,867.50
Dollars (coinage discontinued act of Sept. 26, 1890)	19,499,337	19,499,337.00
Total gold	194,694,465	2,203,853,145.50
SILVER.		
Dollars (coinage discontinued under act of Feb. 12, 1873, and resumed under act of Feb. 28, 1878)	518,419,853	518,419,853.00
Trade dollars	35,965,924	35,965,924.00
Lafayette souvenir dollars, act Mar. 3, 1899	50,000	50,000.00
Half dollars	296,493,418	148,246,709.00
Half dollars, Columbian souvenir	5,002,105	2,501,052.50
Quarter dollars	262,616,486	65,654,121.50
Quarter dollars, Columbian souvenir	40,023	10,005.75
Twenty-cent pieces (coinage discontinued act of May 2, 1878)	1,355,000	271,000.00
Dimes	353,447,282	37,344,728.20
Half-dimes (coinage discontinued act of Feb. 12, 1873)	97,604,388	4,880,219.40
Three-cent pieces (coinage discontinued act of Feb. 12, 1873)	42,736,240	1,282,087.20
Total silver	1,643,730,719	814,625,700.55
MINOR.		
Five-cent pieces, nickel	376,143,262	18,807,163.10
Three-cent pieces, nickel (coinage discontinued act of Sept. 26, 1890) ..	31,378,316	941,349.48
Two-cent pieces, bronze (coinage discontinued act of Feb. 12, 1873) ..	45,601,000	912,020.00
One-cent pieces, copper (coinage discontinued act of Feb. 21, 1857) ..	156,288,741	1,562,887.44
One-cent pieces, nickel (coinage discontinued act of Apr. 22, 1861) ..	200,772,000	2,007,720.00
One-cent pieces, bronze	1,044,513,959	10,445,139.59
Half-cent pieces, copper (coinage discontinued act of Feb. 21, 1857) ..	7,985,222	39,926.11
Total minor	1,862,682,503	34,746,205.72
Total coinage	3,671,107,687	3,053,195,051.77

*Silver-dollar coinage under act of Apr. 2, 1792		\$8,031,238
Bland-Allison Act, Feb. 28, 1878	\$378,166,793	
Sherman Act, July 14, 1890, to Oct. 31, 1893	\$36,087,285	
From repeal of purchasing clause (Nov. 1, 1893) of Sherman Act to June 12, 1898	12,439,872	
Coined under war-revenue bill approved June 13, 1898, to Dec. 31, 1900	48,916,193	
	127,143,350	
Act of Mar. 3, 1891, recoinage of trade dollars	5,078,472	
		510,388,615
Total		518,419,853

XXVIII.—COINAGE OF SILVER DOLLARS, FRACTIONAL AND SUBSIDIARY SILVER, BY ACTS AND DENOMINATIONS, FROM 1792 TO 1900.

Denomination.	1792 to 1853.	1853 to Feb. 12, 1873.	Feb. 12, 1873, to Dec. 31, 1900.	Total silver.
Dollars	\$2,506,890.00	\$5,524,348.00	\$510,388,615.00	\$518,419,853.00
Trade dollars			35,965,924.00	35,965,924.00
Lafayette souvenir dollars			50,000.00	50,000.00
Total dollars	2,506,890.00	5,524,348.00	546,404,539.00	554,435,777.00
Half dollars	66,280,640.50	32,666,832.50	49,299,236.00	148,246,709.00
Half dollars, Columbian			2,501,052.50	2,501,052.50
Quarter dollars	3,994,040.50	17,879,790.50	43,780,290.50	65,654,121.50
Quarter dollars, Columbian			10,005.75	10,005.75
Twenty-cent pieces			271,000.00	271,000.00
Dimes	3,890,230.10	4,908,520.00	28,545,978.10	37,344,728.20
Half dimes	1,825,126.40	3,055,093.00		4,880,219.40
Three-cent pieces	744,927.00	537,160.20		1,282,087.20
Total subsidiary	76,734,964.50	59,047,396.20	124,407,562.85	260,189,923.55
Total silver	79,241,854.50	64,571,744.20	670,812,101.85	814,625,700.55

Fractional silver coinage, 1792 to 1853	\$76,734,964.50
Subsidiary silver coinage, 1853 to Feb. 12, 1873	59,047,396.20
Subsidiary silver coinage, Feb. 12, 1873, to Dec. 31, 1900	124,407,562.85
Total	260,189,923.55

XXIX.—PRODUCTION OF GOLD AND SILVER IN

[From 1493 to 1885 is from a table of averages for certain periods, compiled by Dr. Adolph Soetbeer.

Period.		GOLD.			
		Average annual for period.		Total for period.	
		Fine ounces.	Value.	Fine ounces.	Value.
1	1493-1520	186, 470	\$3, 855, 000	5, 221, 160	\$107, 931, 000
2	1521-1544	230, 194	4, 759, 000	5, 524, 656	114, 205, 000
3	1545-1560	273, 596	5, 656, 000	4, 377, 544	90, 492, 000
4	1561-1580	219, 906	4, 546, 000	4, 398, 120	90, 917, 000
5	1581-1600	237, 267	4, 905, 000	4, 745, 340	98, 095, 000
6	1601-1620	273, 918	5, 662, 000	5, 478, 360	113, 248, 000
7	1621-1640	266, 845	5, 516, 000	5, 336, 900	110, 324, 000
8	1641-1660	281, 955	5, 828, 000	5, 639, 110	116, 571, 000
9	1661-1680	297, 709	6, 154, 000	5, 954, 180	123, 084, 000
10	1681-1700	346, 095	7, 154, 000	6, 921, 895	143, 088, 000
11	1701-1720	412, 163	8, 520, 000	8, 243, 260	170, 403, 000
12	1721-1740	613, 422	12, 681, 000	12, 268, 440	253, 611, 000
13	1741-1760	791, 211	16, 356, 000	15, 824, 230	327, 116, 000
14	1761-1780	665, 666	13, 761, 000	13, 313, 315	275, 211, 000
15	1781-1800	571, 948	11, 823, 000	11, 438, 970	236, 464, 000
16	1801-1810	571, 563	11, 815, 000	5, 715, 627	118, 152, 000
17	1811-1820	367, 957	7, 606, 000	3, 679, 568	76, 063, 000
18	1821-1830	457, 044	9, 448, 000	4, 570, 444	94, 479, 000
19	1831-1840	652, 291	13, 484, 000	6, 522, 913	134, 841, 000
20	1841-1850	1, 760, 502	36, 393, 000	17, 605, 018	363, 928, 000
21	1851-1855	6, 410, 324	132, 513, 000	32, 051, 621	662, 566, 000
22	1856-1860	6, 486, 262	134, 083, 000	32, 431, 312	670, 415, 000
23	1861-1865	5, 949, 582	122, 989, 000	29, 747, 913	614, 944, 000
24	1866-1870	6, 270, 086	129, 614, 000	31, 350, 430	648, 071, 000
25	1871-1875	5, 591, 014	115, 577, 000	27, 955, 068	577, 883, 000
26	1876-1880	5, 543, 110	114, 586, 000	27, 715, 550	572, 931, 000
27	1881-1885	4, 794, 755	99, 116, 000	23, 973, 773	495, 582, 000
28	1886-1890	5, 461, 282	112, 895, 000	27, 306, 411	564, 474, 000
29	1891-1895	7, 882, 565	162, 947, 000	39, 412, 823	814, 736, 000
30	1896	9, 783, 914	202, 251, 600	9, 783, 914	202, 251, 600
31	1897	11, 420, 068	236, 073, 700	11, 420, 068	236, 073, 700
32	1898	13, 877, 806	286, 879, 700	13, 877, 806	286, 879, 700
33	1899	14, 859, 285	307, 168, 800	14, 859, 285	307, 168, 800
34	1900	12, 366, 319	255, 634, 500	12, 366, 319	255, 634, 500
Total.....				487, 031, 343	10, 067, 833, 300

THE WORLD SINCE THE DISCOVERY OF AMERICA.

For the years 1886 to 1898 the production is the annual estimate of the Bureau of the Mint.]

SILVER.				PERCENTAGE OF PRODUCTION.			
Annual average for period.		Total for period.		By weight.		By value.	
Fine ounces.	Coining value.	Fine ounces.	Coining value.	Gold.	Silver.	Gold.	Silver.
1,511,050	\$1,954,000	42,309,400	\$54,703,000	11	89	66.4	33.6
2,899,930	3,740,000	69,598,320	89,986,000	7.4	92.6	55.9	44.1
10,017,940	12,952,000	160,287,040	207,240,000	2.7	97.3	30.4	69.6
9,628,925	12,450,000	192,578,500	248,990,000	2.2	97.8	26.7	73.3
13,467,635	17,443,000	269,352,700	348,254,000	1.7	98.3	22	78
13,596,235	17,579,000	271,924,700	351,579,000	2	98	24.4	75.6
12,654,240	16,364,000	253,084,800	327,221,000	2.1	97.9	25.2	74.8
11,776,545	15,226,000	235,530,900	304,525,000	2.3	97.7	27.7	72.3
10,834,550	14,008,000	216,694,000	280,166,000	2.7	97.3	30.5	69.5
10,992,085	14,212,000	219,841,700	284,240,000	3.1	96.9	33.5	66.5
11,432,540	14,781,000	228,650,800	295,629,000	3.5	96.5	36.6	63.4
13,863,080	17,924,000	277,261,600	358,480,000	4.2	95.8	41.4	58.6
17,140,642	22,162,000	342,812,235	443,232,000	4.4	95.6	42.5	57.5
20,985,591	27,133,000	419,741,820	542,658,000	3.1	96.9	33.7	66.3
28,264,779	36,540,000	565,235,580	730,810,000	2	98	24.4	75.6
28,746,922	37,168,000	287,469,225	371,677,000	1.9	98.1	24.1	75.9
17,385,755	22,479,000	173,857,555	224,780,000	2.1	97.9	25.3	74.7
14,807,004	19,144,000	148,070,040	194,444,000	3	97	33	67
19,175,867	24,793,000	191,758,675	247,930,000	3.3	96.7	35.2	64.8
25,090,342	32,440,000	250,903,422	324,400,000	6.6	93.4	52.9	47.1
28,488,597	36,824,000	142,442,986	184,169,000	18.4	81.6	78.3	21.7
29,095,428	37,618,000	145,477,142	188,092,000	18.2	81.8	78.1	21.9
35,401,972	45,772,000	177,009,862	228,861,000	14.4	85.6	72.9	27.1
43,051,583	55,663,000	215,257,914	278,313,000	12.7	87.3	70	30
63,317,014	81,864,000	316,585,069	409,322,000	8.1	94.9	58.5	41.5
78,775,602	101,851,000	393,878,009	509,256,000	6.6	93.4	53	47
92,003,944	118,955,000	460,019,722	594,773,000	5	95	45.5	54.5
108,911,431	140,815,000	544,557,155	704,074,000	4.8	95.2	44.5	55.5
157,584,331	203,742,000	787,906,656	1,018,708,000	4.8	95.2	44.4	55.6
157,061,370	203,069,200	157,061,370	203,069,200	5.9	94.1	49.9	50.1
160,421,082	207,413,000	160,421,082	207,413,000	6.7	93.3	53.2	46.8
169,055,253	218,576,800	169,055,253	218,576,800	7.6	92.4	56.8	43.2
167,577,533	216,665,700	167,577,533	216,665,700	8.1	91.9	58.6	41.4
172,838,870	223,468,200	172,838,870	223,468,200	6.7	93.3	53.4	46.6
		8,827,018,635	11,412,704,900	5.2	94.8	46.7	53.3

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Philadelphia from

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
1793 to 1795		\$27, 950	\$43, 535			
1796		60, 800	16, 995		\$165. 00	
1797		91, 770	32, 030		4, 390. 00	
1798		79, 740	124, 335		1, 535. 00	
1799		174, 830	37, 255		1, 200. 00	
1800		259, 650	58, 110			
1801		292, 540	130, 030			
1802		150, 900	265, 880		6, 530. 00	
1803		89, 790	167, 530		1, 057. 50	
1804		97, 950	152, 375		8, 317. 50	
1805			165, 915		4, 452. 50	
1806			320, 465		4, 040. 00	
1807			420, 465		17, 030. 00	
1808			277, 890		6, 775. 00	
1809			169, 375			
1810			501, 435			
1811			497, 905			
1812			290, 435			
1813			477, 140			
1814			77, 270			
1815			3, 175			
1816						
1817						
1818			242, 940			
1819			258, 615			
1820			1, 319, 030			
1821			173, 205		16, 120. 00	
1822			88, 980			
1823			72, 425			
1824			86, 700		6, 500. 00	
1825			145, 300		11, 085. 00	
1826			90, 345		1, 900. 00	
1827			124, 565		7, 000. 00	
1828			140, 145			
1829			287, 210		8, 507. 50	
1830			631, 755		11, 350. 00	
1831			702, 970		11, 300. 00	
1832			787, 435		11, 000. 00	
1833			968, 150		10, 400. 00	
1834			3, 660, 845		293, 425. 00	
1835			1, 857, 670		328, 505. 00	
1836			2, 765, 735		1, 369, 965. 00	
1837			1, 035, 605		112, 700. 00	
1838		72, 000	1, 432, 940		117, 575. 00	
1839		382, 480	590, 715		67, 552. 50	
1840		473, 380	686, 910		47, 147. 50	
1841		631, 310	79, 165			
1842		815, 070	137, 890		7, 057. 50	
1843		754, 620	3, 056, 025		251, 365. 00	
1844		63, 610	1, 701, 650		16, 960. 00	
1845		261, 530	2, 085, 495		227, 627. 50	
1846		200, 950	1, 979, 710		53, 995. 00	
1847		8, 622, 580	4, 579, 905		74, 535. 00	
1848		1, 454, 840	1, 303, 875		22, 215. 00	
1849		6, 536, 180	665, 350		58, 235. 00	\$688, 567
1850	\$23, 405, 220	2, 914, 510	322, 455		632, 307. 50	481, 953
1851	41, 743, 100	1, 763, 280	1, 887, 525		3, 431, 870. 00	3, 317, 671
1852	41, 060, 520	2, 631, 060	2, 869, 505		2, 899, 202. 50	2, 045, 351
1853	25, 226, 520	2, 012, 530	1, 528, 850		3, 511, 670. 00	4, 076, 051
1854	15, 157, 980	542, 500	803, 375	\$415, 854	1, 490, 645. 00	1, 639, 445
1855	7, 293, 320	1, 217, 010	585, 490	151, 665	588, 700. 00	758, 269
1856	6, 597, 560	604, 900	989, 950	78, 030	960, 600. 00	1, 762, 936
1857	8, 787, 500	166, 060	490, 940	62, 673	535, 325. 00	774, 789
1858	4, 234, 280	25, 210	75, 680	6, 399	118, 442. 50	117, 995
1859	871, 940	160, 930	84, 070	46, 914	98, 610. 00	168, 244
1860	11, 553, 400	117, 830	99, 125	21, 465	56, 687. 50	36, 668
1861	59, 529, 060	1, 132, 330	3, 199, 750	18, 216	3, 181, 295. 00	527, 499
1862	1, 842, 660	109, 950	22, 325	17, 355	280, 882. 50	1, 326, 865
1863	2, 855, 800	12, 480	12, 360	15, 117	75. 00	6, 250
1864	4, 085, 700	35, 800	21, 100	8, 040	7, 185. 00	5, 950
1865	7, 024, 000	40, 050	6, 475	3, 495	3, 862. 50	3, 725
Carried forward	261, 268, 560	35, 080, 900	50, 967, 775	845, 223	20, 996, 875. 00	17, 738, 228

NOTE.—Not susceptible of exact statement by years of actual date of coin, the registry of annual coinage being of coin delivered by coiners of mints within the given year, and these deliveries not having been invariably completed within the year of the date of the coin, as now required.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS.

its organization, 1793, to December 31, 1900.]

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
	\$204,791	\$161,572.00				\$4,320.80	
	72,920		\$1,473.50		\$2,213.50	511.50	
	7,776	1,959.00	63.00		2,526.10	2,226.35	
	327,536				2,755.00		
	423,515						
	220,920				2,176.00	1,200.00	
	54,454	15,144.50			3,464.00	1,695.50	
	41,650	14,945.00			1,097.50	650.50	
	66,064	15,857.50			3,304.00	1,892.50	
	19,570	78,259.50	1,684.50		826.50		
	321	105,861.00	30,348.50		12,078.00	780.00	
		419,788.00	51,531.00				
		525,788.00	55,160.75		16,500.00		
		684,300.00					
		702,905.00			4,471.00		
		638,138.00			635.50		
		601,822.00			6,518.00		
		814,029.50					
		620,951.50					
		519,537.50			42,150.00		
			17,308.00				
		23,575.00	5,000.75				
		607,783.50					
		980,161.00	90,293.50				
		1,104,000.00	36,000.00				
		375,561.00	31,861.00		94,258.70		
		652,898.50	54,212.75		118,651.20		
		779,786.50	16,020.00		10,000.00		
		847,100.00	4,450.00		44,000.00		
		1,752,477.00					
		1,471,583.00	42,000.00		51,000.00		
		2,002,090.00					
		2,746,700.00	1,000.00		121,500.00		
		1,537,600.00	25,500.00		12,500.00		
		1,856,078.00			77,000.00	61,500.00	
		2,382,400.00			51,000.00	62,000.00	
		2,936,830.00	99,500.00		77,135.00	62,135.00	
		2,398,500.00	50,000.00		52,250.00	48,250.00	
		2,603,000.00	39,000.00		48,500.00	68,500.00	
		3,206,002.00	71,500.00		63,500.00	74,000.00	
		2,676,003.00	488,000.00		141,000.00	138,000.00	
	1,000	3,273,100.00	118,000.00		119,000.00	95,000.00	
		1,814,910.00	63,100.00		104,200.00	113,800.00	
		1,773,000.00	208,000.00		199,250.00	112,750.00	
	300	1,667,280.00	122,786.50		105,311.50	53,457.50	
	61,005	717,504.00	47,031.75		135,858.00	67,204.25	
	173,000	155,000.00	30,000.00		162,250.00	57,500.00	
	184,618	1,006,382.00	22,000.00		188,750.00	40,750.00	
	165,100	1,922,000.00	161,400.00		137,000.00	58,250.00	
	20,000	883,000.00	105,300.00		7,250.00	21,500.00	
	24,500	294,500.00	230,500.00		175,500.00	78,200.00	
	110,600	1,105,000.00	127,500.00		3,130.00	1,350.00	
	140,750	578,000.00	183,500.00		24,500.00	63,700.00	
	15,000	290,000.00	36,500.00		45,150.00	33,400.00	
	62,600	626,000.00	85,000.00		83,900.00	65,450.00	
	7,500	113,500.00	47,700.00		193,150.00	47,750.00	
	1,300	100,375.00	40,000.00		102,650.00	39,050.00	\$163,422.00
	1,100	38,565.00	44,265.00		153,550.00	50,025.00	559,905.00
	46,110	1,766,354.00	3,813,555.00		1,217,301.00	667,251.00	342,000.00
	33,140	1,491,000.00	3,095,000.00		447,000.00	287,000.00	20,130.00
	26,000	379,750.00	714,250.00		207,500.00	87,500.00	4,170.00
	63,500	469,000.00	1,816,000.00		578,000.00	244,000.00	43,740.00
	94,000	994,000.00	2,411,000.00		558,000.00	364,000.00	31,260.00
		2,113,000.00	1,842,000.00		154,000.00	175,000.00	48,120.00
	256,500	374,000.00	336,000.00		43,000.00	17,000.00	10,950.00
	218,930	151,850.00	201,350.00		60,700.00	39,950.00	8,610.00
	78,500	1,444,200.00	1,213,650.00		192,400.00	164,050.00	14,940.00
	12,090	126,175.00	233,137.50		84,755.00	74,627.50	10,906.50
	27,660	251,830.00	48,015.00		1,446.00	923.00	643.80
	31,170	189,785.00	23,517.50		3,907.00	23.50	14.10
	47,000	255,950.00	14,825.00		1,050.00	675.00	255.00
	3,342,490	65,225,996.50	18,676,790.50		6,552,468.50	3,648,798.90	1,259,066.40

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Philadelphia from

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
Brought forward	\$261,268,560	\$35,080,900	\$50,967,775	\$846,223	\$20,996,875.00	\$17,738,228
1866.....	13,975,500	37,800	33,600	12,090	7,775.00	7,180
1867.....	5,021,300	31,400	34,600	7,950	8,125.00	5,250
1868.....	1,972,000	106,550	28,625	14,625	9,062.50	10,525
1869.....	3,503,100	18,550	8,925	7,575	10,862.50	5,925
1870.....	3,103,700	25,350	20,175	10,605	11,387.50	6,335
1871.....	1,603,000	17,800	16,150	3,990	13,375.00	3,930
1872.....	5,037,600	16,500	8,450	6,090	7,575.00	3,530
1873.....	34,196,500	8,250	562,525	75	445,062.50	125,125
1874.....	7,336,000	531,600	17,540	125,460	9,850.00	198,820
1875.....	5,914,800	1,200	1,100	60	1,050.00	420
1876.....	11,678,100	7,320	7,385	135	10,552.50	3,245
1877.....	7,953,400	8,170	5,760	4,464	4,130.00	3,920
1878.....	10,872,900	738,000	658,700	246,972	715,650.00	3,020
1879.....	4,152,600	3,847,700	1,509,750	9,090	222,475.00	3,030
1880.....	1,029,120	16,448,760	15,832,180	3,108	7,490.00	1,636
1881.....	45,200	38,772,600	28,544,000	1,650	1,700.00	7,660
1882.....	12,600	23,244,800	12,572,800	4,320	10,100.00	5,040
1883.....	800	2,087,400	1,167,200	2,820	4,900.00	10,840
1884.....	1,420	769,050	955,240	8,318	4,982.50	6,206
1885.....	16,560	2,535,270	3,007,530	2,730	2,217.50	12,205
1886.....	22,120	2,361,600	1,942,160	3,426	10,220.00	6,016
1887.....	2,420	536,800	435	18,480	15,705.00	8,543
1888.....	4,525,320	1,329,960	91,480	15,873	40,245.00	16,080
1889.....	882,220	44,850	37,825	7,287	44,120.00	30,729
1890.....	1,519,900	580,430	21,640	.....	22,032.50	.....
1891.....	28,840	918,680	307,065	.....	27,600.00	.....
1892.....	90,460	7,975,520	3,767,860	.....	6,362.50	.....
1893.....	6,886,780	18,408,950	7,640,985	.....	75,265.00	.....
1894.....	27,379,800	24,707,780	4,789,775	.....	10,305.00	.....
1895.....	22,293,120	5,678,260	6,729,680	.....	15,297.50	.....
1896.....	15,853,260	763,480	295,315	.....	48,005.00	.....
1897.....	27,665,220	10,001,590	4,339,415	.....	74,760.00	.....
1898.....	3,409,400	8,121,970	3,167,475	.....	60,412.50	.....
1899.....	33,387,680	12,623,050	8,553,645	.....	68,375.00	.....
1900.....	37,491,680	2,939,600	7,028,650	.....	168,012.50	.....
Total	560,132,980	221,327,490	164,673,415	1,357,716	23,191,915.00	18,223,438

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its organization, 1793, to December 31, 1900.]

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	\$3,342,490	\$65,225,996.50	\$18,676,790.50	.....	\$6,552,468.50	\$3,648,798.90	\$1,259,066.40
.....	49,625	372,812.50	4,381.25	.....	872.50	536.25	681.75
.....	60,325	212,162.50	5,156.25	.....	662.50	431.25	438.75
.....	182,700	189,100.00	7,500.00	.....	46,625.00	4,295.00	123.00
.....	424,300	397,950.00	4,150.00	.....	25,660.00	10,430.00	453.00
.....	433,000	300,450.00	21,850.00	.....	47,150.00	26,830.00	120.00
.....	1,115,760	582,680.00	42,808.00	.....	75,361.00	74,443.00	127.80
.....	1,106,450	440,775.00	45,737.50	.....	239,645.00	147,397.50	58.50
\$397,500	293,600	1,308,750.00	371,075.00	.....	394,710.00	35,630.00	18.00
987,800	.....	1,180,150.00	117,975.00	.....	294,070.00	.....	.....
218,900	.....	3,013,750.00	1,073,375.00	\$7,940	1,035,070.00	.....	.....
456,150	.....	4,209,575.00	4,454,287.50	3,180	1,146,115.00	.....	.....
3,039,710	.....	4,152,255.00	2,727,927.50	102	731,051.00	.....	.....
900	10,509,550	689,200.00	565,200.00	120	167,880.00	.....	.....
1,541	14,807,100	2,950.00	3,675.00	.....	1,510.00	.....	.....
1,987	42,601,355	4,877.50	3,738.75	.....	3,735.50	.....	.....
960	9,163,975	5,487.50	3,243.75	.....	2,497.50	.....	.....
1,097	11,101,100	2,750.00	4,075.00	.....	391,110.00	.....	.....
979	12,291,039	4,519.50	3,859.75	.....	767,571.20	.....	.....
.....	14,070,875	2,637.50	2,218.75	.....	336,638.00	.....	.....
.....	17,787,767	3,065.00	3,632.50	.....	253,342.70	.....	.....
.....	19,963,886	2,943.00	1,471.50	.....	637,757.00	.....	.....
.....	20,290,710	2,855.00	2,677.50	.....	1,128,393.90	.....	.....
.....	19,183,833	6,416.50	2,708.25	.....	549,648.70	.....	.....
.....	21,726,811	6,355.50	3,177.75	.....	738,071.10	.....	.....
.....	16,802,590	6,295.00	20,117.50	.....	991,154.10	.....	.....
.....	8,694,206	100,300.00	930,150.00	.....	1,531,060.00	.....	.....
.....	1,037,245	^a 942,622.50	2,059,311.25	.....	1,212,124.50	.....	.....
.....	378,792	^b 2,939,448.50	^c 1,371,203.75	.....	334,079.20	.....	.....
.....	110,972	574,486.00	858,243.00	.....	133,097.20	.....	.....
.....	12,880	917,609.00	1,110,220.00	.....	69,088.00	.....	.....
.....	9,976,762	475,381.00	968,690.50	.....	200,076.20	.....	.....
.....	2,822,731	1,240,365.50	2,035,182.75	.....	1,086,926.40	.....	.....
.....	5,884,735	1,478,367.50	2,775,183.75	.....	1,632,073.50	.....	.....
.....	330,846	2,769,423.00	3,156,211.50	.....	1,958,084.60	.....	.....
.....	^d 8,880,912	2,381,456.00	2,504,228.00	.....	1,760,091.20	.....	.....
5,107,524	245,438,922	96,146,217.50	45,991,464.00	11,342	26,475,471.00	3,948,791.90	1,260,487.20

^a Includes Columbian souvenir half dollars, 1892, \$475,000.
^b Includes Columbian souvenir half dollars, 1893, \$2,026,052.50.
^c Includes Columbian souvenir quarter dollars, 1893, \$10,005.75.
^d Includes 50,000 Lafayette souvenir dollars.

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Philadelphia from

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
1793-1795			
1796			
1797			
1798			
1799			
1800			
1801			
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1863			
1864			\$396,950.00
1865		\$341,460.00	272,800.00
1866	\$737,125.00	144,030.00	63,540.00
1867	1,545,475.00	117,450.00	58,775.00
1868	1,440,850.00	97,560.00	56,075.00
1869	819,750.00	48,120.00	30,930.00
Carried forward	4,543,200.00	748,620.00	879,070.00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its organization, 1793, to December 31, 1900.]

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
\$10,660.33	\$712.67	\$71,485.00	\$370,683.80	\$11,373.00	\$453,541.80
9,747.00	577.40	77,960.00	77,118.50	10,324.40	165,402.90
8,975.10	535.24	128,190.00	14,550.45	9,510.34	152,250.79
9,797.00	.....	205,610.00	330,291.00	9,797.00	545,698.00
9,045.85	60.83	213,285.00	423,515.00	9,106.68	645,906.68
28,221.75	1,057.65	317,760.00	224,296.00	29,279.40	571,335.40
13,628.37	.....	422,570.00	74,758.00	13,628.37	510,956.37
34,351.00	71.83	423,310.00	58,343.00	34,422.83	516,075.83
24,713.53	489.50	258,377.50	87,118.00	25,203.03	370,698.53
7,568.38	5,276.56	258,642.50	100,340.50	12,844.94	371,827.94
9,411.16	4,072.32	170,367.50	149,388.50	13,483.48	333,239.48
3,480.00	1,780.00	324,505.00	471,349.00	5,260.00	801,084.00
7,272.21	2,380.00	437,495.00	597,418.75	9,652.21	1,014,595.96
11,090.00	2,000.00	284,665.00	684,300.00	13,090.00	982,055.00
2,228.67	5,772.86	169,375.00	707,376.00	8,001.53	884,752.53
14,585.00	1,075.00	501,435.00	638,773.50	15,660.00	1,155,868.50
2,180.25	315.70	497,905.00	608,340.00	2,495.95	1,108,740.95
10,755.00	.....	290,435.00	814,029.50	10,755.00	1,115,219.50
4,180.00	.....	477,140.00	620,951.50	4,180.00	1,102,271.50
3,578.30	.....	77,270.00	561,687.50	3,578.30	642,535.80
.....	.....	3,175.00	17,308.00	.....	20,483.00
28,209.82	.....	.....	28,575.75	28,209.82	56,785.57
39,484.00	.....	.....	607,783.50	39,484.00	647,267.50
31,670.00	.....	242,940.00	1,070,454.50	31,670.00	1,345,064.50
26,710.00	.....	258,615.00	1,140,000.00	26,710.00	1,425,325.00
44,075.50	.....	1,319,030.00	501,680.70	44,075.50	1,864,786.20
3,890.00	.....	189,325.00	825,762.45	3,890.00	1,018,977.45
20,723.39	.....	88,980.00	805,806.50	20,723.39	915,509.89
.....	.....	72,425.00	895,550.00	.....	967,975.00
12,620.00	.....	93,200.00	1,752,477.00	12,620.00	1,858,297.00
14,611.00	315.00	156,385.00	1,564,583.00	14,926.00	1,735,894.00
15,174.25	1,170.00	92,245.00	2,002,090.00	16,344.25	2,110,679.25
23,577.32	.....	131,565.00	2,869,200.00	23,577.32	3,024,342.32
22,606.24	3,030.00	140,145.00	1,575,600.00	25,636.24	1,741,381.24
14,145.00	2,435.00	295,717.50	1,994,578.00	16,580.00	2,306,875.50
17,115.00	.....	643,105.00	2,495,400.00	17,115.00	3,155,620.00
33,522.60	11.00	714,270.00	3,175,600.00	33,603.60	3,923,473.60
23,620.00	.....	798,435.00	2,579,000.00	23,620.00	3,401,055.00
27,390.00	770.00	978,550.00	2,759,000.00	28,160.00	3,765,710.00
18,551.00	600.00	3,954,270.00	3,415,002.00	19,151.00	7,388,423.00
38,784.00	705.00	2,186,175.00	3,463,003.00	39,489.00	5,668,667.00
21,110.00	1,990.00	4,135,700.00	3,606,100.00	23,100.00	7,764,900.00
55,583.00	.....	1,148,305.00	2,096,010.00	55,583.00	3,299,898.00
63,702.00	.....	1,622,515.00	2,293,000.00	63,702.00	3,979,217.00
31,286.61	.....	1,040,747.50	1,949,135.50	31,286.61	3,021,169.61
24,627.00	.....	1,207,437.50	1,028,603.00	24,627.00	2,260,667.50
15,973.67	.....	710,475.00	577,750.00	15,973.67	1,304,198.67
23,833.90	.....	960,017.50	1,442,500.00	23,833.90	2,426,351.40
24,283.20	.....	4,062,010.00	2,443,750.00	24,283.20	6,530,043.20
23,987.52	.....	1,782,220.00	1,037,050.00	23,987.52	2,843,257.52
38,948.04	.....	2,574,652.50	803,200.00	38,948.04	3,416,800.54
41,208.00	.....	2,234,655.00	1,347,580.00	41,208.00	3,623,443.00
61,836.69	.....	13,277,020.00	990,450.00	61,836.69	14,329,306.69
64,157.99	.....	2,780,930.00	420,050.00	64,157.99	3,265,137.99
41,785.00	199.32	7,948,332.00	922,950.00	41,981.32	8,913,266.32
44,268.44	199.06	27,756,445.50	409,600.00	44,467.50	28,210,513.00
98,897.07	738.36	52,143,446.00	446,797.00	99,635.43	52,689,878.43
50,630.94	.....	51,505,638.50	847,410.00	50,630.94	52,403,679.44
66,411.31	648.47	36,355,621.00	7,852,571.00	67,059.78	44,275,251.78
42,361.56	276.79	20,049,799.00	5,373,270.00	42,638.35	25,465,707.35
15,748.29	282.50	10,594,454.00	1,419,170.00	16,030.79	12,029,654.79
26,904.63	202.15	10,993,976.00	3,214,240.00	27,106.78	14,235,322.78
177,834.56	175.90	10,817,287.00	4,452,260.00	178,010.46	15,447,557.46
246,000.00	.....	4,578,006.50	4,332,120.00	246,000.00	9,156,126.50
364,000.00	.....	1,430,708.00	1,037,450.00	364,000.00	2,832,158.00
205,660.00	.....	11,885,175.50	681,390.00	205,660.00	12,772,225.50
101,000.00	.....	67,588,150.00	3,107,740.00	101,000.00	70,796,890.00
280,750.00	.....	3,600,037.50	541,691.50	280,750.00	4,422,479.00
498,400.00	.....	2,902,082.00	330,517.80	498,400.00	3,730,999.80
529,737.14	.....	4,163,775.00	248,417.10	926,687.14	5,338,879.24
354,292.86	.....	7,081,607.50	319,755.00	968,552.86	8,369,915.36
98,265.00	.....	14,073,945.00	428,909.25	1,042,960.00	15,545,814.25
98,240.00	.....	5,108,625.00	278,876.25	1,819,910.00	7,207,411.25
102,665.00	.....	2,141,387.50	430,343.00	1,697,150.00	4,268,880.50
64,200.00	.....	3,554,937.50	862,643.00	963,000.00	5,380,580.50
4,680,577.44	39,926.11	411,776,456.00	100,706,382.30	10,891,393.55	523,374,231.85

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Philadelphia from

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
Brought forward.....	\$4, 543, 200. 00	\$748, 620. 00	\$879, 070. 00
1870	240, 300. 00	40, 050. 00	17, 225. 00
1871	28, 050. 00	18, 120. 00	14, 425. 00
1872	301, 800. 00	25, 860. 00	1, 300. 00
1873	227, 500. 00	35, 190. 00	.....
1874	176, 900. 00	23, 700. 00	.....
1875	104, 850. 00	6, 840. 00	.....
1876	126, 500. 00	4, 860. 00	.....
1877 .....	.....	.....	.....
1878	117. 50	70. 50	.....
1879	1, 455. 00	1, 236. 00	.....
1880	997. 75	748. 65	.....
1881	3, 618. 75	32, 417. 25	.....
1882	573, 830. 00	759. 00	.....
1883	1, 148, 471. 05	318. 27	.....
1884	563, 697. 10	169. 26	.....
1885	73, 824. 50	143. 70	.....
1886	166, 514. 50	128. 70	.....
1887	763, 182. 60	238. 83	.....
1888	536, 024. 15	1, 232. 49	.....
1889	794, 068. 05	646. 83	.....
1890	812, 963. 60	.....	.....
1891	841, 717. 50	.....	.....
1892	584, 982. 10	.....	.....
1893	668, 509. 75	.....	.....
1894	270, 656. 60	.....	.....
1895	498, 994. 20	.....	.....
1896	442, 146. 00	.....	.....
1897	1, 021, 436. 75	.....	.....
1898	626, 604. 35	.....	.....
1899	1, 301, 451. 55	.....	.....
1900	1, 362, 799. 75	.....	.....
Total	18, 807, 163. 10	941, 349. 48	912, 020. 00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its organization, 1793, to December 31, 1900.]

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
\$4,680,577.41	\$39,926.11	\$411,776,456.00	\$100,706,382.30	\$10,891,393.55	\$523,374,231.85
52,750.00		3,177,552.50	829,400.00	350,325.00	1,357,277.50
39,295.00		1,658,245.00	1,891,179.80	99,890.00	3,649,314.80
40,420.00		5,079,745.00	1,980,063.50	369,380.00	7,429,188.50
116,765.00		35,337,537.50	2,804,283.00	379,155.00	38,518,275.50
141,875.00		8,219,270.00	2,579,995.00	342,475.00	11,441,740.00
135,280.00		5,918,630.00	5,319,035.00	246,970.00	11,514,635.00
79,440.00		11,706,737.50	40,269,307.50	210,800.00	22,186,845.00
8,525.00		7,979,844.00	10,651,045.50	8,525.00	18,639,414.50
57,998.50		13,235,242.00	11,932,850.00	58,186.50	25,226,278.50
162,312.00		9,744,645.00	14,816,776.00	165,003.00	24,726,424.00
389,649.55		33,322,294.00	12,615,693.75	391,395.95	46,329,383.70
392,115.75		67,372,810.00	9,176,163.75	428,151.75	76,977,125.50
385,811.00		35,849,960.00	11,500,132.00	960,400.00	48,310,492.00
455,981.09		3,273,960.00	13,067,968.45	1,604,770.41	17,946,698.86
232,617.42		1,740,246.50	14,412,369.25	796,483.78	16,949,069.53
117,653.81		5,576,512.50	18,047,807.20	191,622.04	23,815,941.74
176,542.90		4,345,542.00	20,606,057.50	313,186.10	25,294,785.60
452,264.83		582,383.00	21,424,636.40	1,215,686.26	23,222,705.66
374,944.11		6,018,958.00	19,742,606.45	912,200.78	26,673,765.23
488,693.61		1,047,031.00	22,474,415.35	1,283,408.49	24,801,854.84
571,828.54		2,144,002.50	17,820,186.60	1,381,792.14	21,348,981.24
470,723.50		4,282,185.00	11,305,716.00	1,312,441.00	13,900,342.00
376,498.32		11,840,202.50	5,251,303.25	961,480.42	18,052,986.17
466,421.95		33,011,980.00	5,023,523.45	1,134,931.70	39,170,435.15
167,521.32		56,887,660.00	1,676,798.20	438,177.92	59,002,636.12
383,436.36		34,716,357.50	2,109,797.00	882,430.56	37,708,585.06
390,572.93		16,960,060.00	11,620,909.70	832,718.93	29,413,688.63
504,663.30		42,080,985.00	7,185,205.65	1,526,100.05	50,792,290.70
498,230.79		14,759,257.50	14,770,359.75	1,124,835.14	27,654,452.39
536,000.31		51,632,750.00	8,214,565.10	1,837,451.86	64,684,766.96
668,337.61		47,627,942.50	15,526,687.20	2,031,137.39	65,185,767.09
14,015,747.03	39,926.11	988,906,951.00	424,380,219.60	34,716,205.72	1,448,003,379.32

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at San Francisco]

Calendar years.	GOLD.						SILVER.	
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	Dollars.	Trade dollars.
1854.....	\$2,823,360	\$1,238,260	\$1,340	.....	\$615	\$14,632	.....	.....
1855.....	17,593,500	90,000	305,000	\$19,800	.....	.....	.....	.....
1856.....	23,795,000	680,000	525,500	103,500	177,800	24,600	.....	.....
1857.....	19,410,000	260,000	435,000	42,000	170,000	10,000	.....	.....
1858.....	16,931,200	118,000	93,000	.....	3,000	10,000	.....	.....
1859.....	12,728,900	70,000	66,100	.....	38,000	15,000	\$20,000	.....
1860.....	10,899,000	50,000	106,000	21,000	89,000	13,000	.....	.....
1861.....	15,360,000	155,000	90,000	.....	60,000	.....	.....	.....
1862.....	17,083,460	125,000	47,500	.....	20,000	.....	.....	.....
1863.....	19,331,400	100,000	85,000	.....	27,000	.....	.....	.....
1864.....	15,873,200	25,000	19,440	.....	.....	.....	.....	.....
1865.....	20,850,000	167,000	138,060	.....	58,440	.....	.....	.....
1866.....	16,845,000	200,000	219,600	.....	97,400	.....	.....	.....
1867.....	18,415,000	90,000	145,000	.....	70,000	.....	.....	.....
1868.....	16,750,000	135,000	260,000	.....	85,000	.....	.....	.....
1869.....	13,735,000	61,300	155,000	.....	73,750	.....	.....	.....
1870.....	19,640,000	80,000	85,000	.....	40,000	3,000	.....	.....
1871.....	18,560,000	165,000	125,000	.....	55,000	.....	.....	.....
1872.....	15,600,000	173,000	182,000	.....	45,000	.....	9,000	.....
1873.....	20,812,000	120,000	155,000	.....	67,500	.....	700	\$703,000
1874.....	24,280,000	100,000	80,000	.....	.....	.....	.....	2,549,000
1875.....	24,600,000	.....	45,000	.....	29,000	.....	.....	4,487,000
1876.....	31,940,000	50,000	20,000	.....	12,500	.....	.....	5,227,000
1877.....	34,700,000	170,000	133,500	.....	88,500	.....	.....	9,519,000
1878.....	34,780,000	261,000	723,500	.....	445,000	.....	9,774,000	4,162,000
1879.....	24,476,000	2,240,000	2,131,000	.....	108,750	.....	9,110,000	.....
1880.....	16,720,000	5,062,500	6,744,500	.....	.....	.....	8,900,000	.....
1881.....	14,510,000	9,700,000	4,845,000	.....	.....	.....	12,760,000	.....
1882.....	22,500,000	1,320,000	4,845,000	.....	.....	.....	9,250,000	.....
1883.....	23,780,000	380,000	416,000	.....	.....	.....	6,250,000	.....
1884.....	18,320,000	1,242,500	885,000	.....	.....	.....	3,200,000	.....
1885.....	13,670,000	2,280,000	6,057,500	.....	.....	.....	1,497,000	.....
1886.....	.....	8,260,000	16,340,000	.....	.....	.....	750,000	.....
1887.....	5,660,000	8,170,000	9,560,000	.....	.....	.....	1,771,000	.....
1888.....	17,192,000	6,487,000	1,469,500	.....	.....	.....	657,000	.....
1889.....	15,494,000	4,254,000	.....	.....	.....	.....	700,000	.....
1890.....	16,055,000	.....	.....	.....	.....	.....	8,230,373	.....
1891.....	25,762,500	.....	.....	.....	.....	.....	5,296,000	.....
1892.....	18,603,000	1,155,000	1,492,000	.....	.....	.....	1,200,000	.....
1893.....	19,923,500	1,413,500	1,120,000	.....	.....	.....	100,000	.....
1894.....	20,971,000	250,000	279,500	.....	.....	.....	1,260,000	.....
1895.....	22,870,000	490,000	560,000	.....	.....	.....	400,000	.....
1896.....	28,078,500	1,237,500	777,000	.....	.....	.....	5,000,000	.....
1897.....	29,405,000	2,347,500	1,770,000	.....	.....	.....	5,825,000	.....
1898.....	51,503,500	4,736,000	6,987,000	.....	.....	.....	4,102,000	.....
1899.....	40,206,000	8,410,000	7,725,000	.....	.....	.....	2,562,000	.....
1900.....	49,190,000	810,000	1,645,000	.....	.....	.....	3,540,000	.....
Total	978,265,020	74,932,060	79,889,540	186,300	1,861,255	90,232	102,164,073	26,617,000

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

from its organization, 1854, to December 31, 1900.]

SILVER.					TOTAL COINAGE.		TOTAL VALUE.
Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Gold.	Silver.	
					\$4,084,207		\$4,084,207.00
\$64,975.00	\$99,100.00				18,008,300	\$164,075.00	18,172,375.00
105,500.00	71,500.00		\$7,000.00		25,306,400	184,000.00	25,490,400.00
79,000.00	20,500.00				20,327,000	99,500.00	20,426,500.00
238,000.00	30,250.00		6,000.00		17,158,200	274,250.00	17,432,450.00
283,000.00	20,000.00		6,000.00		12,918,000	329,000.00	13,247,000.00
236,000.00	14,000.00		14,000.00		11,178,000	264,000.00	11,442,000.00
469,750.00	24,000.00		17,250.00		15,665,000	511,000.00	16,176,000.00
676,000.00	16,750.00		18,075.00		17,275,960	710,825.00	17,986,785.00
458,000.00			45,750.00	\$5,000	19,543,400	478,750.00	20,022,150.00
329,000.00	5,000.00		23,000.00	4,500	15,917,640	361,500.00	16,279,140.00
337,500.00	10,250.00		17,500.00	6,000	21,213,500	374,250.00	21,584,750.00
527,000.00	7,000.00		13,500.00	6,000	17,362,000	553,500.00	17,915,500.00
598,000.00	12,000.00		14,000.00	6,000	18,720,000	630,000.00	19,350,000.00
580,000.00	24,000.00		26,000.00	14,000	17,230,000	611,000.00	17,874,000.00
328,000.00	19,000.00		45,000.00	11,500	14,028,050	403,500.00	14,431,550.00
502,000.00			5,000.00		19,818,000	507,000.00	20,355,000.00
1,089,000.00	7,725.00		32,000.00	8,050	18,905,000	1,136,775.00	20,041,775.00
290,000.00	20,750.00		19,000.00	41,850	16,000,000	380,600.00	16,380,600.00
116,500.00	39,000.00		45,500.00	16,200	21,154,500	920,900.00	22,075,400.00
197,000.00	98,000.00		24,000.00		24,460,000	2,868,000.00	27,328,000.00
1,600,000.00	170,000.00	\$231,000	907,000.00		24,674,000	7,395,000.00	32,069,000.00
2,264,000.00	2,149,000.00		1,042,000.00		32,022,500	10,682,000.00	42,704,500.00
2,678,000.00	2,249,000.00		234,000.00		35,092,000	14,680,000.00	49,772,000.00
6,000.00	35,000.00				36,209,500	13,977,000.00	50,186,500.00
					28,955,750	9,110,000.00	38,065,750.00
					28,527,000	8,900,000.00	37,427,000.00
					29,085,000	12,760,000.00	41,845,000.00
					28,665,000	9,250,000.00	37,915,000.00
					24,576,000	6,250,000.00	30,826,000.00
			56,496.90		20,447,500	3,256,496.90	23,703,996.90
			4,369.00		22,007,500	1,501,369.00	23,508,869.00
			20,652.40		24,600,000	770,652.40	25,370,652.40
			445,445.00		23,390,000	2,216,445.00	25,606,445.00
	304,000.00		172,000.00		25,148,500	1,133,000.00	26,281,500.00
			97,267.80		19,748,000	797,267.80	20,545,267.80
			142,307.60		16,055,000	8,372,680.60	24,427,680.60
	554,000.00		319,611.60		25,762,500	6,169,611.60	31,932,111.60
514,514.00	241,019.75		99,071.00		21,250,000	2,054,604.75	23,304,604.75
370,000.00	363,633.75		249,140.10		22,457,000	1,082,773.85	23,539,773.85
2,024,345.00	662,205.25		2.40		21,500,500	3,946,552.65	25,447,052.65
554,043.00	441,170.25		112,000.00		23,920,000	1,507,213.25	25,427,213.25
570,474.00	47,009.75		57,505.60		30,093,000	5,674,989.35	35,767,989.35
466,950.00	135,557.25		134,284.40		33,522,500	6,561,791.65	40,084,291.65
1,179,275.00	255,148.00		170,250.70		63,226,500	5,706,673.70	68,933,173.70
843,205.50	177,000.00		186,749.30		56,341,000	3,768,954.80	60,109,954.80
1,280,161.00	464,646.25		516,827.00		51,645,000	5,801,634.25	57,446,634.25
21,855,192.50	8,787,215.25	231,000	5,315,555.80	119,100	1,135,224,407	165,119,136.55	1,300,343,543.55

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at New Orleans from its organization, 1838, to

Calendar years.	GOLD.						SILVER.
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	Dollars.
1838							
1839					\$44,452.50		
1840			\$152,000		65,500.00		
1841		\$25,000	41,750		18,450.00		
1842		274,000	82,000		49,500.00		
1843		1,751,620	505,375		920,005.00		
1844		1,187,000	1,823,000				
1845		475,000	205,000				
1846		817,800	290,000		165,000.00		\$59,000
1847		5,715,000	60,000		310,000.00		
1848		358,500					
1849		239,000				\$215,000	
1850	\$2,820,000	575,000			210,000.00	14,000	40,000
1851	6,300,000	2,630,000	205,000		370,000.00	290,000	
1852	3,800,000	180,000			350,000.00	140,000	
1853	1,420,000	510,000				290,000	
1854	65,000	525,000	230,000	\$72,000	382,500.00		
1855	160,000	180,000	55,500			55,000	
1856	45,000	145,000	50,000		52,750.00		
1857	600,000	55,000	65,000		85,000.00		
1858	705,000	200,000					
1859	182,000	23,000					360,000
1860	132,000	111,000					515,000
1861 ^a	100,000						
1879	46,500	15,000					2,887,000
1880		92,000					5,305,000
1881		83,500					5,708,000
1882		108,200					6,090,000
1883		8,000					8,725,000
1884							9,730,000
1885							9,185,000
1886							10,710,000
1887							11,550,000
1888		243,350					12,150,000
1889							11,875,000
1890							10,701,000
1891							7,954,529
1892		286,880	50,000				2,744,000
1893		170,000	550,000				300,000
1894		1,075,000	83,000				1,723,000
1895		980,000					450,000
1896							4,900,000
1897		425,000					4,004,000
1898							4,440,000
1899		370,470					12,290,000
1900							12,590,000
Total	16,375,500	19,804,320	4,447,625	72,000	3,023,157.50	1,004,000	156,985,529

^aNo coinage from 1862 to 1878, inclusive.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its suspension, 1864, and from its reopening, 1879, to December 31, 1900.]

SILVER.					TOTAL COINAGE.		TOTAL VALUE.
Half dollars.	Quarter dollars.	Dimes.	Half dimes.	Three cents.	Gold.	Silver.	
		\$40,243.40				\$40,243.40	\$40,243.40
\$81,488		124,327.20	\$54,827.50		\$44,452.50	260,642.70	305,095.20
127,550	\$106,300	117,500.00	46,750.00		247,500.00	698,100.00	915,600.00
200,500	113,000	200,750.00	40,750.00		85,200.00	555,000.00	640,200.00
478,500	192,250	202,000.00	17,500.00		405,500.00	890,250.00	1,295,750.00
1,134,000	242,000	15,000.00			3,177,000.00	1,394,000.00	4,568,000.00
1,002,500	185,000		14,000.00		3,010,000.00	1,198,500.00	4,208,500.00
1,047,000		23,000.00			680,000.00	1,070,000.00	1,750,000.00
1,152,000					1,272,800.00	1,211,000.00	2,483,800.00
1,292,000	92,000				6,085,000.00	1,384,000.00	7,469,000.00
1,590,000			30,000.00		358,500.00	1,620,000.00	1,978,500.00
1,455,000		30,000.00	7,000.00		454,000.00	1,192,000.00	1,646,000.00
1,228,000	103,000	51,000.00	34,500.00		3,619,000.00	1,456,500.00	5,075,500.00
201,000	22,000	40,000.00	43,000.00	\$21,600	9,795,000.00	327,600.00	10,122,600.00
72,000	24,000	43,000.00	43,000.00		4,470,000.00	452,000.00	4,622,000.00
664,000	333,000	110,000.00	118,000.00		2,220,000.00	1,225,000.00	3,445,000.00
2,620,000	371,000	177,000.00	78,000.00		1,274,500.00	3,246,000.00	4,520,500.00
1,844,000	44,000		30,000.00		450,500.00	1,918,000.00	2,368,500.00
1,329,000	242,000	118,000.00	55,000.00		292,750.00	1,744,000.00	2,036,750.00
409,000	295,000	154,000.00	69,000.00		805,000.00	927,000.00	1,732,000.00
3,647,000	130,000	29,000.00	83,000.00		905,000.00	3,889,000.00	4,794,000.00
1,417,000	65,000	48,000.00	28,000.00		205,000.00	1,918,000.00	2,123,000.00
645,000	97,000	4,000.00	53,000.00		243,000.00	1,314,000.00	1,557,000.00
165,000					100,000.00	165,000.00	265,000.00
					61,500.00	2,887,000.00	2,948,500.00
					92,000.00	5,305,000.00	5,397,000.00
					83,500.00	5,708,000.00	5,791,500.00
					108,200.00	6,090,000.00	6,198,200.00
					8,000.00	8,725,000.00	8,733,000.00
						9,730,000.00	9,730,000.00
						9,185,000.00	9,185,000.00
						10,710,000.00	10,710,000.00
						11,550,000.00	11,550,000.00
					213,350.00	12,450,000.00	12,363,350.00
						11,875,000.00	11,875,000.00
						10,701,000.00	10,701,000.00
	17,000	454,000.00				8,425,529.00	8,425,529.00
195,000	660,000	384,170.00			336,880.00	3,983,170.00	4,320,050.00
694,500	849,000	176,000.00			720,000.00	2,049,500.00	2,739,500.00
1,069,000	713,000	72,000.00			1,158,000.00	3,577,000.00	4,735,000.00
883,000	704,000	44,000.00			980,000.00	2,081,000.00	3,061,000.00
462,000	371,000	61,000.00				5,794,000.00	5,794,000.00
316,000	353,700	66,600.00			425,000.00	4,740,300.00	5,165,300.00
437,000	467,000	213,000.00				5,557,000.00	5,557,000.00
862,000	661,000	265,000.00			370,470.00	14,078,000.00	14,448,470.00
1,372,000	854,000	201,000.00				15,017,000.00	15,017,000.00
30,092,038	8,306,250	3,463,590.60	812,327.50	21,600	44,726,602.50	199,681,335.10	244,407,937.60

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Carson City,

Calendar years.	GOLD.			SILVER.	
	Double eagles.	Eagles.	Half eagles.	Dollars.	Trade dollars.
1870.....	\$75,780	\$59,080	\$38,375	\$12,462	.....
1871.....	293,740	71,850	103,850	1,376	.....
1872.....	593,000	55,000	84,900	3,150	.....
1873.....	448,200	45,430	37,080	2,300	\$124,500
1874.....	2,301,700	167,670	105,990	.....	1,373,200
1875.....	2,223,020	77,150	59,140	.....	1,573,700
1876.....	2,768,820	46,960	34,435	.....	509,000
1877.....	854,300	33,320	43,400	.....	534,000
1878.....	263,600	32,440	45,270	2,212,000	97,000
1879.....	214,160	17,620	86,405	756,000	.....
1880.....	.....	111,900	255,085	594,900	.....
1881.....	.....	240,150	69,430	296,000	.....
1882.....	782,800	67,640	414,085	1,133,000	.....
1883.....	1,199,240	120,000	64,790	1,204,000	.....
1884.....	1,622,780	99,250	82,010	1,136,000	.....
1885.....	189,000	.....	.....	228,000	.....
1886 ^a.....	.....	.....	.....	.....	.....
1887 ^a.....	.....	.....	.....	.....	.....
1888 ^a.....	.....	.....	.....	.....	.....
1889 ^b	618,900	.....	.....	350,000	.....
1890.....	1,824,480	175,000	269,000	2,309,041	.....
1891.....	100,000	1,037,320	1,040,000	1,618,000	.....
1892.....	545,300	400,000	444,840	1,352,000	.....
1893 ^c	368,040	140,000	300,000	677,000	.....
Total.....	17,283,560	2,997,780	3,548,085	13,881,329	4,211,400

^a Coinage suspended. ^b Operations resumed October 1, 1889.

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Charlotte, N. C., from its organization, 1838, to its suspension, 1861.]

Calendar years.	GOLD.			TOTAL VALUE.
	Half eagles.	Quarter eagles.	Dollars.	
1838.....	\$64,565	\$19,770.00	.....	\$84,335.00
1839.....	117,335	45,432.50	.....	162,767.50
1840.....	95,140	32,095.00	.....	127,235.00
1841.....	107,555	25,742.50	.....	133,297.50
1842.....	137,400	16,842.50	.....	154,242.50
1843.....	221,765	65,240.00	.....	287,005.00
1844 ^a	118,155	29,055.00	.....	147,210.00
1845 ^b.....	.....	.....	.....	.....
1846.....	64,975	12,020.00	.....	76,995.00
1847.....	420,755	58,065.00	.....	478,820.00
1848.....	322,360	41,970.00	.....	364,330.00
1849.....	324,115	25,550.00	\$11,634	361,299.00
1850.....	317,955	22,870.00	6,966	347,791.00
1851.....	245,880	37,307.50	41,267	324,454.50
1852.....	362,870	24,430.00	9,434	396,734.00
1853.....	327,855	.....	11,515	339,370.00
1854.....	196,455	18,237.50	4	214,696.50
1855.....	198,940	9,192.50	9,803	217,935.50
1856.....	142,285	19,782.50	.....	162,067.50
1857.....	156,800	.....	13,280	170,080.00
1858.....	194,280	22,640.00	.....	216,920.00
1859.....	159,235	.....	5,235	164,470.00
1860.....	74,065	18,672.50	.....	92,737.50
1861.....	34,395	.....	.....	34,395.00
Total.....	4,405,135	544,915.00	109,138	5,059,188.00

^a Mint burned July 27, 1844. ^b No coinage.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

from its organization, 1870, to June 30, 1893.]

SILVER.				TOTAL COINAGE.		TOTAL VALUE.
Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Gold.	Silver.	
\$27,308.50	\$2,085.00	.....	.....	\$173,235	\$41,855.50	\$215,090.50
69,975.00	2,722.50	.....	\$2,010.00	469,440	76,083.50	545,523.50
136,000.00	2,275.00	.....	2,400.00	732,900	143,825.00	876,725.00
168,530.00	4,115.50	.....	3,119.10	530,710	302,564.60	833,274.60
29,500.00	.....	.....	1,081.70	2,575,360	1,403,781.70	3,979,141.70
504,000.00	35,000.00	\$26,658	464,500.00	2,359,310	2,603,858.00	4,963,168.00
978,000.00	1,236,000.00	2,000	827,000.00	2,850,215	3,552,000.00	6,402,215.00
710,000.00	1,048,000.00	.....	770,000.00	928,020	3,062,000.00	3,990,020.00
31,000.00	249,000.00	.....	20,000.00	341,310	2,609,000.00	2,950,310.00
.....	.....	.....	.....	318,185	756,000.00	1,074,185.00
.....	.....	.....	.....	366,985	591,000.00	957,985.00
.....	.....	.....	.....	309,580	296,000.00	605,580.00
.....	.....	.....	.....	1,264,525	1,133,000.00	2,397,525.00
.....	.....	.....	.....	1,384,030	1,204,000.00	2,588,030.00
.....	.....	.....	.....	1,804,040	1,136,000.00	2,940,040.00
.....	.....	.....	.....	189,000	228,000.00	417,000.00
.....						
.....						
.....	.....	.....	.....	618,900	350,000.00	968,900.00
.....	.....	.....	.....	2,268,180	2,309,041.00	4,577,221.00
.....	.....	.....	.....	2,177,320	1,618,000.00	3,795,320.00
.....	.....	.....	.....	1,360,140	1,352,000.00	2,712,140.00
.....	.....	.....	.....	808,040	677,000.00	1,485,040.00
2,654,313.50	2,579,198.00	28,658	2,090,110.80	23,829,425	25,445,009.30	49,274,434.30

° Coinage suspended from May 23, 1893.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

[Coinage of the mint at Dahlonega, Ga., from its organization, 1838, to its suspension, 1861.]

Calendar years.	GOLD.				TOTAL VALUE.
	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	
1838.....	\$102,915	.....	.....	.....	\$102,915.00
1839.....	94,695	.....	\$34,185.00	.....	128,880.00
1840.....	114,480	.....	8,830.00	.....	123,310.00
1841.....	152,475	.....	10,410.00	.....	162,885.00
1842.....	298,040	.....	11,607.50	.....	309,647.50
1843.....	492,260	.....	90,522.50	.....	582,782.50
1844.....	444,910	.....	43,330.00	.....	488,240.00
1845.....	453,145	.....	48,650.00	.....	501,795.00
1846.....	401,470	.....	48,257.50	.....	449,727.50
1847.....	322,025	.....	39,460.00	.....	361,485.00
1848.....	237,325	.....	34,427.50	.....	271,752.50
1849.....	195,180	.....	27,362.50	\$21,588	244,130.50
1850.....	219,750	.....	30,370.00	8,382	258,502.00
1851.....	313,550	.....	28,160.00	9,882	351,592.00
1852.....	457,260	.....	10,195.00	6,360	473,815.00
1853.....	448,390	.....	7,945.00	6,583	462,918.00
1854.....	282,065	\$3,360	4,400.00	2,935	292,760.00
1855.....	112,160	.....	2,807.50	1,811	116,778.50
1856.....	98,930	.....	2,185.00	1,460	102,575.00
1857.....	85,230	.....	5,910.00	3,533	94,673.00
1858.....	76,810	.....	.....	3,477	80,287.00
1859.....	51,830	.....	5,616.00	4,952	62,392.00
1860.....	73,175	.....	.....	1,566	74,741.00
1861.....	7,985	.....	.....	.....	7,985.00
Total	5,536,055	3,360	494,625.00	72,529	6,106,569.00

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES
RECAPITULATION.

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
1793-95.....		\$27,950	\$43,535			
1796.....		60,800	16,995		\$165.00	
1797.....		91,770	32,030		4,390.00	
1798.....		79,740	124,335		1,535.00	
1799.....		174,830	37,255		1,200.00	
1800.....		259,650	58,110			
1801.....		292,540	130,030			
1802.....		150,900	265,880		6,530.00	
1803.....		89,790	167,530		1,057.50	
1804.....		97,950	152,375		8,317.50	
1805.....			165,915		4,452.50	
1806.....			320,465		4,040.00	
1807.....			420,465		17,030.00	
1808.....			277,890		6,775.00	
1809.....			169,375			
1810.....			501,435			
1811.....			497,905			
1812.....			290,435			
1813.....			477,140			
1814.....			77,270			
1815.....			3,175			
1816.....						
1817.....						
1818.....			242,940			
1819.....			258,615			
1820.....			1,319,030			
1821.....			173,205		16,120.00	
1822.....			88,980			
1823.....			72,425			
1824.....			86,700		6,500.00	
1825.....			145,300		11,085.00	
1826.....			90,345		1,900.00	
1827.....			124,565		7,000.00	
1828.....			140,145			
1829.....			287,210		8,507.50	
1830.....			631,755		11,350.00	
1831.....			702,970		11,300.00	
1832.....			787,435		11,000.00	
1833.....			968,150		10,400.00	
1834.....			3,660,845		293,425.00	
1835.....			1,857,670		328,505.00	
1836.....			2,765,735		1,369,965.00	
1837.....			1,035,605		112,700.00	
1838.....		72,000	1,600,420		137,345.00	
1839.....		382,480	802,745		191,622.50	
1840.....		473,380	1,048,530		153,572.50	
1841.....		656,310	380,945		54,602.50	
1842.....		1,089,070	655,330		85,007.50	
1843.....		2,506,240	4,275,425		1,327,132.50	
1844.....		1,250,610	4,087,715		89,345.00	
1845.....		736,530	2,743,640		276,277.50	
1846.....		1,018,750	2,736,155		279,272.50	
1847.....		14,337,580	5,382,685		482,060.00	
1848.....		1,813,310	1,863,560		98,612.50	
1849.....		6,775,180	1,181,645		111,147.50	\$936,789
1850.....	\$26,225,220	3,489,510	860,160		895,547.50	511,301
1851.....	48,043,106	4,393,280	2,651,955		3,867,337.50	3,658,820
1852.....	44,860,520	2,811,060	3,689,635		3,283,827.50	2,201,145
1853.....	26,646,520	2,522,530	2,305,095		3,519,615.00	4,384,149
1854.....	18,052,340	2,305,760	1,513,235	\$191,214	1,896,397.50	1,657,016
1855.....	25,046,820	1,487,010	1,257,090	171,465	600,700.00	824,883
1856.....	30,437,560	1,429,900	1,806,665	181,530	1,213,117.50	1,788,996
1857.....	28,797,500	481,060	1,232,970	104,673	796,235.00	801,602
1858.....	21,873,480	343,210	439,770	6,399	144,082.50	131,472
1859.....	13,782,840	253,930	361,235	46,914	142,220.00	193,431
1860.....	22,584,400	278,830	352,365	42,465	164,360.00	51,234
1861.....	74,989,060	1,287,330	3,332,130	18,216	3,241,295.00	527,499
1862.....	18,926,120	234,950	69,825	17,355	300,882.50	1,326,865
1863.....	22,187,200	112,480	97,360	15,117	27,075.00	6,250
1864.....	19,958,900	60,800	40,540	8,040	7,185.00	5,950
1865.....	27,874,000	207,050	144,535	3,495	62,302.50	3,725
1866.....	30,820,500	237,800	253,200	12,090	105,175.00	7,180
1867.....	23,436,300	121,400	179,600	7,950	78,125.00	5,250
1868.....	18,722,000	241,550	288,625	14,625	94,062.50	10,525
1869.....	17,238,100	82,850	163,925	7,575	84,612.50	5,925
Carried forward.....	560,502,480	54,819,680	67,470,880	1,149,123	26,065,402.50	19,040,007

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION.

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	\$204, 791	\$161, 572. 00				\$4, 320. 80	.....
.....	72, 920		\$1, 473. 50		\$2, 213. 50	511. 50	.....
.....	7, 776	1, 959. 00	63. 00		2, 526. 10	2, 226. 35	.....
.....	327, 536				2, 755. 00		.....
.....	423, 515						.....
.....	220, 920				2, 176. 00	1, 200. 00	.....
.....	54, 454	15, 144. 50			3, 464. 00	1, 695. 50	.....
.....	41, 650	14, 945. 00			1, 097. 50	650. 50	.....
.....	66, 064	15, 857. 50			3, 304. 00	1, 892. 50	.....
.....	19, 570	78, 259. 50	1, 684. 50		826. 50		.....
.....	321	105, 861. 00	30, 348. 50		12, 078. 00	780. 00	.....
.....		419, 788. 00	51, 531. 00				.....
.....		525, 788. 00	55, 160. 75		16, 500. 00		.....
.....		684, 300. 00					.....
.....		702, 905. 00			4, 471. 00		.....
.....		638, 138. 00			635. 50		.....
.....		601, 822. 00			6, 518. 00		.....
.....		814, 029. 50					.....
.....		620, 951. 50					.....
.....		519, 537. 50			42, 150. 00		.....
.....			17, 308. 00				.....
.....		23, 575. 00	5, 000. 75				.....
.....		607, 783. 50					.....
.....		980, 161. 00	90, 293. 50				.....
.....		1, 104, 000. 00	36, 000. 00				.....
.....		375, 561. 00	31, 861. 00		94, 258. 70		.....
.....		652, 898. 50	54, 212. 75		118, 651. 20		.....
.....		779, 786. 50	16, 020. 00		10, 000. 00		.....
.....		847, 100. 00	4, 450. 00		44, 000. 00		.....
.....		1, 752, 477. 00					.....
.....		1, 471, 583. 00	42, 000. 00		51, 000. 00		.....
.....		2, 002, 090. 00					.....
.....		2, 746, 700. 00	1, 000. 00		121, 500. 00		.....
.....		1, 537, 600. 00	25, 500. 00		12, 500. 00		.....
.....		1, 856, 078. 00			77, 000. 00	61, 500. 00	.....
.....		2, 382, 400. 00			51, 000. 00	62, 000. 00	.....
.....		2, 936, 830. 00	99, 500. 00		77, 135. 00	62, 135. 00	.....
.....		2, 398, 500. 00	80, 000. 00		52, 250. 00	48, 250. 00	.....
.....		2, 603, 000. 00	39, 000. 00		48, 500. 00	68, 500. 00	.....
.....		3, 206, 002. 00	71, 500. 00		63, 500. 00	74, 000. 00	.....
.....		2, 676, 003. 00	488, 000. 00		141, 000. 00	138, 000. 00	.....
.....	1, 000	3, 273, 100. 00	118, 000. 00		119, 000. 00	95, 000. 00	.....
.....		1, 814, 910. 00	63, 100. 00		104, 200. 00	113, 800. 00	.....
.....		1, 773, 000. 00	208, 000. 00		239, 493. 40	112, 750. 00	.....
.....	300	1, 748, 768. 00	122, 786. 50		229, 638. 70	108, 285. 00	.....
.....	61, 005	1, 145, 054. 00	153, 331. 75		253, 358. 00	113, 951. 25	.....
.....	173, 000	355, 500. 00	143, 000. 00		363, 000. 00	98, 250. 00	.....
.....	184, 618	1, 484, 882. 00	214, 250. 00		390, 750. 00	58, 250. 00	.....
.....	165, 100	3, 056, 000. 00	403, 400. 00		152, 000. 00	58, 250. 00	.....
.....	20, 000	1, 885, 500. 00	290, 300. 00		7, 250. 00	32, 500. 00	.....
.....	24, 500	1, 341, 500. 00	230, 500. 00		198, 500. 00	78, 200. 00	.....
.....	169, 600	2, 257, 000. 00	127, 500. 00		3, 130. 00	1, 350. 00	.....
.....	140, 750	1, 870, 000. 00	275, 500. 00		24, 500. 00	63, 700. 00	.....
.....	15, 000	1, 880, 000. 00	36, 500. 00		45, 150. 00	63, 400. 00	.....
.....	62, 600	1, 781, 000. 00	85, 000. 00		113, 900. 00	72, 450. 00	.....
.....	47, 500	1, 341, 500. 00	150, 700. 00		244, 150. 00	82, 250. 00	.....
.....	1, 300	301, 375. 00	62, 000. 00		142, 650. 00	82, 050. 00	\$185, 022. 00
.....	1, 100	110, 565. 00	68, 265. 00		196, 550. 00	63, 025. 00	559, 905. 00
.....	46, 110	2, 430, 354. 00	4, 146, 555. 00		1, 327, 301. 00	785, 251. 00	342, 000. 00
.....	33, 140	4, 111, 000. 00	3, 466, 000. 00		624, 000. 00	365, 000. 00	20, 130. 00
.....	26, 000	2, 288, 725. 00	857, 350. 00		207, 500. 00	117, 500. 00	4, 170. 00
.....	63, 500	1, 903, 500. 00	2, 129, 500. 00		703, 000. 00	299, 000. 00	43, 740. 00
.....	94, 000	1, 482, 000. 00	2, 726, 500. 00		712, 000. 00	433, 000. 00	31, 260. 00
.....		5, 998, 000. 00	2, 002, 250. 00		189, 000. 00	258, 000. 00	48, 120. 00
.....	636, 500	2, 074, 000. 00	421, 000. 00		97, 000. 00	45, 000. 00	10, 950. 00
.....	733, 930	1, 032, 850. 00	312, 350. 00		78, 700. 00	92, 950. 00	8, 610. 00
.....	78, 500	2, 078, 950. 00	1, 237, 650. 00		209, 650. 00	164, 050. 00	14, 940. 00
.....	12, 090	802, 175. 00	249, 887. 50		102, 830. 00	74, 627. 50	10, 906. 50
.....	27, 660	709, 830. 00	48, 015. 00		17, 196. 00	5, 923. 00	643. 80
.....	31, 170	518, 785. 00	28, 517. 50		26, 907. 00	4, 523. 50	14. 10
.....	47, 000	593, 450. 00	25, 075. 00		18, 550. 00	6, 675. 00	255. 00
.....	49, 625	899, 812. 50	11, 381. 25		14, 372. 50	6, 536. 25	681. 75
.....	60, 325	810, 162. 50	17, 156. 25		14, 662. 50	6, 431. 25	138. 75
.....	182, 700	769, 100. 00	31, 500. 00		72, 625. 00	18, 295. 00	123. 00
.....	424, 300	725, 950. 00	23, 150. 00		70, 660. 00	21, 930. 00	153. 00
.....	5, 053, 440	95, 509, 284. 50	21, 727, 878. 00		8, 376, 184. 10	4, 529, 818. 90	1, 281, 762. 90

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES
RECAPITULATION—Continued.

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
Brought forward	\$560,502,480	\$54,819,680	\$67,470,880	\$1,149,123	\$26,065,402.50	\$19,040,007
1870.....	22,819,480	164,430	143,550	10,605	51,387.50	9,335
1871.....	20,456,740	254,650	245,000	3,990	68,375.00	3,930
1872.....	21,230,600	244,500	275,350	6,090	52,575.00	3,530
1873.....	55,456,700	173,680	754,605	75	512,562.50	125,125
1874.....	33,917,700	799,270	203,530	125,460	9,850.00	198,820
1875.....	32,737,820	78,350	105,240	60	30,050.00	420
1876.....	46,386,920	104,280	61,820	135	23,052.50	3,245
1877.....	43,504,700	211,490	182,660	4,464	92,630.00	3,920
1878.....	45,916,500	1,031,440	1,427,470	246,972	1,160,650.00	3,020
1879.....	28,889,260	6,120,320	3,727,155	9,090	331,225.00	3,030
1880.....	17,749,120	21,715,160	22,831,765	3,108	7,490.00	1,636
1881.....	14,585,200	48,796,250	33,458,430	1,650	1,700.00	7,660
1882.....	23,295,400	24,740,640	17,831,885	4,620	10,100.00	5,040
1883.....	24,980,040	2,595,400	1,647,990	2,820	4,900.00	10,840
1884.....	19,944,200	2,110,800	1,922,250	3,318	4,982.50	6,206
1885.....	13,875,560	4,815,270	9,065,030	2,730	2,217.50	12,205
1886.....	22,120	10,621,600	18,282,160	3,426	10,220.00	6,016
1887.....	5,662,420	8,706,800	9,560,435	18,480	15,705.00	8,543
1888.....	21,717,320	8,030,310	1,560,980	15,873	40,245.00	16,080
1889.....	16,995,120	4,298,850	37,825	7,287	44,120.00	30,729
1890.....	19,399,080	755,430	290,640	.....	22,032.50	.....
1891.....	25,891,340	1,956,000	1,347,065	.....	27,600.00	.....
1892.....	19,238,760	9,817,400	5,724,700	.....	6,362.50	.....
1893.....	27,178,320	20,132,450	9,610,985	.....	75,265.00	.....
1894.....	48,350,800	26,032,780	5,152,275	.....	10,305.00	.....
1895.....	45,163,120	7,148,260	7,289,680	.....	15,297.50	.....
1896.....	43,931,760	2,000,980	1,072,315	.....	48,005.00	.....
1897.....	57,070,220	12,774,090	6,109,415	.....	74,760.00	.....
1898.....	54,912,900	12,857,970	10,154,475	.....	60,412.50	.....
1899.....	73,593,680	21,403,520	16,278,645	.....	68,375.00	.....
1900.....	86,681,680	3,749,600	8,673,650	.....	168,012.50	.....
Total	1,572,057,060	319,061,650	262,499,855	1,619,376	29,115,867.50	19,499,337

^a Includes \$475,000 in Columbian coins.

^b Includes \$2,026,052.50 in Columbian coins.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	\$5, 053, 440	\$95, 509, 284. 50	\$21, 727, 878. 00	.....	\$8, 376, 184. 10	\$4, 529, 818. 90	\$1, 281, 762. 90
.....	445, 462	829, 758. 50	23, 935. 00	.....	52, 150. 00	26, 830. 00	120. 00
.....	1, 117, 136	1, 741, 655. 00	53, 255. 50	.....	109, 371. 00	82, 493. 00	127. 80
.....	1, 118, 600	866, 775. 00	68, 762. 50	.....	261, 045. 00	189, 247. 50	58. 50
\$1, 225, 000	296, 600	1, 593, 780. 00	414, 190. 50	.....	443, 329. 10	51, 830. 00	18. 00
4, 910, 000	.....	1, 406, 650. 00	215, 975. 00	.....	319, 151. 70	.....	.....
6, 279, 600	.....	5, 117, 750. 00	1, 278, 375. 00	\$265, 598	2, 406, 570. 00	.....	.....
6, 192, 150	.....	7, 451, 575. 00	7, 839, 287. 50	5, 180	3, 015, 115. 00	.....	.....
13, 092, 710	.....	7, 540, 255. 00	6, 024, 927. 50	102	1, 735, 051. 00	.....	.....
4, 259, 900	22, 495, 550	726, 200. 00	849, 200. 00	120	187, 880. 00	.....	.....
1, 541	27, 560, 100	2, 950. 00	3, 675. 00	.....	1, 510. 00	.....	.....
1, 987	27, 397, 355	4, 877. 50	3, 738. 75	.....	3, 735. 50	.....	.....
960	27, 927, 975	5, 487. 50	3, 243. 75	.....	2, 497. 50	.....	.....
1, 097	27, 574, 100	2, 750. 00	4, 075. 00	.....	391, 110. 00	.....	.....
979	28, 470, 039	4, 519. 50	3, 859. 75	.....	767, 571. 20	.....	.....
.....	28, 436, 875	2, 637. 50	2, 218. 75	.....	393, 134. 90	.....	.....
.....	28, 697, 767	3, 065. 00	3, 632. 50	.....	257, 711. 70	.....	.....
.....	31, 423, 886	2, 943. 00	1, 471. 50	.....	658, 409. 40	.....	.....
.....	33, 611, 710	2, 855. 00	2, 677. 50	.....	1, 573, 838. 90	.....	.....
.....	31, 990, 833	6, 416. 50	306, 708. 25	.....	721, 648. 70	.....	.....
.....	34, 651, 811	6, 355. 50	3, 177. 75	.....	835, 338. 90	.....	.....
.....	38, 043, 004	6, 295. 00	20, 147. 50	.....	1, 133, 461. 70	.....	.....
.....	23, 562, 735	100, 300. 00	1, 551, 150. 00	.....	2, 304, 671. 60	.....	.....
.....	6, 333, 245	^a 1, 652, 136. 50	2, 960, 331. 00	.....	1, 695, 365. 50	.....	.....
.....	1, 455, 792	^b 4, 003, 948. 50	^c 2, 583, 837. 50	.....	759, 219. 30	.....	.....
.....	3, 093, 972	3, 667, 831. 00	2, 233, 448. 25	.....	205, 099. 60	.....	.....
.....	862, 880	2, 354, 652. 00	2, 255, 390. 25	.....	225, 088. 00	.....	.....
.....	19, 876, 762	1, 507, 855. 00	1, 386, 700. 25	.....	318, 581. 80	.....	.....
.....	12, 651, 731	2, 023, 315. 50	2, 521, 440. 00	.....	1, 287, 810. 80	.....	.....
.....	14, 426, 735	3, 094, 642. 50	3, 497, 331. 75	.....	2, 015, 324. 20	.....	.....
.....	15, 182, 846	4, 474, 628. 50	3, 994, 211. 50	.....	2, 409, 833. 90	.....	.....
.....	^d 25, 010, 912	5, 033, 617. 00	3, 822, 874. 25	.....	2, 477, 918. 20	.....	.....
35, 965, 924	518, 469, 853	150, 747, 761. 50	65, 664, 127. 25	271, 000	37, 344, 728. 20	4, 880, 219. 40	1, 282, 087. 20

^a Includes \$10,005.75 in Columbian coins.^d Includes 50,000 Lafayette souvenir dollars.

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES
RECAPITULATION—Continued.

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
1793-1795			
1796			
1797			
1798			
1799			
1800			
1801			
1802			
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1863			
1864			\$396,950.00
1865		\$341,460.00	272,800.00
1866	\$737,125.00	144,030.00	63,540.00
1867	1,545,475.00	117,450.00	58,775.00
1868	1,440,850.00	97,560.00	56,075.00
1869	819,750.00	48,120.00	30,930.00
Carried forward	4,543,200.00	748,620.00	879,070.00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
\$10,660.33	\$712.67	\$71,485.00	\$370,683.80	\$11,373.00	\$453,541.80
9,747.00	577.40	77,960.00	77,118.50	10,324.40	165,402.90
8,975.10	535.24	128,190.00	14,550.45	9,510.34	152,250.79
9,797.00	-----	205,610.00	330,291.00	9,797.00	545,698.00
9,045.85	60.83	213,285.00	423,515.00	9,106.68	645,906.68
28,221.75	1,057.65	317,760.00	224,296.00	29,279.40	571,335.40
13,628.37	-----	422,570.00	74,758.00	43,628.37	510,956.37
34,351.00	71.83	423,310.00	58,343.00	34,422.83	516,075.83
24,713.53	489.50	258,377.50	87,118.00	25,203.03	370,698.53
7,568.38	5,276.56	258,642.50	100,340.50	12,844.94	371,827.94
9,411.16	4,072.32	170,367.50	149,388.50	13,483.48	333,239.48
3,480.00	1,780.00	324,505.00	471,319.00	5,260.00	801,084.00
7,272.21	2,380.00	437,495.00	597,448.75	9,652.21	1,044,595.96
11,090.00	2,000.00	284,665.00	684,300.00	13,090.00	982,055.00
2,228.67	5,772.86	169,375.00	707,376.00	8,001.53	884,752.53
14,585.00	1,075.00	501,435.00	638,773.50	15,660.00	1,155,868.50
2,180.25	315.70	497,905.00	608,340.00	2,495.95	1,108,740.95
10,755.00	-----	290,435.00	814,029.50	10,755.00	1,115,219.50
4,180.00	-----	477,140.00	620,951.50	4,180.00	1,102,271.50
3,578.30	-----	77,270.00	561,687.50	3,578.30	642,535.80
-----	-----	3,175.00	17,308.00	-----	20,483.00
28,209.82	-----	-----	28,575.75	28,209.82	56,785.57
39,484.00	-----	-----	607,783.50	39,484.00	647,267.50
31,670.00	-----	242,940.00	1,070,454.50	31,670.00	1,345,064.50
26,710.00	-----	258,615.00	1,140,000.00	26,710.00	1,425,325.00
44,075.50	-----	1,319,030.00	501,680.70	44,075.50	1,864,786.20
3,890.00	-----	189,325.00	825,762.45	3,890.00	1,018,977.45
20,723.39	-----	88,980.00	805,806.50	20,723.39	915,509.89
-----	-----	72,425.00	895,550.00	-----	967,975.00
12,620.00	-----	93,200.00	1,752,477.00	12,620.00	1,858,297.00
14,611.00	315.00	156,385.00	1,564,583.00	14,926.00	1,735,894.00
15,174.25	1,170.00	92,245.00	2,002,090.00	16,344.25	2,110,679.25
23,577.32	-----	131,565.00	2,869,200.00	23,577.32	2,024,342.32
22,606.24	3,030.00	140,145.00	1,575,600.00	25,636.24	1,741,381.21
14,145.00	2,435.00	295,717.50	1,994,578.00	16,580.00	2,306,875.50
17,115.00	-----	643,105.00	2,495,400.00	17,115.00	3,155,620.00
33,592.60	11.00	714,270.00	3,175,600.00	33,603.60	3,923,473.60
23,620.00	-----	798,435.00	2,579,000.00	23,620.00	3,401,055.00
27,390.00	770.00	978,550.00	2,759,000.00	28,160.00	3,765,710.00
18,551.00	600.00	3,954,270.00	3,415,002.00	19,151.00	7,388,423.00
38,784.00	705.00	2,186,175.00	3,443,003.00	39,489.00	5,668,667.00
21,110.00	1,990.00	4,135,700.00	3,606,100.00	23,100.00	7,764,900.00
55,583.00	-----	1,148,305.00	2,096,010.00	55,583.00	3,299,898.00
63,702.00	-----	1,809,765.00	2,333,243.40	63,702.00	4,206,710.40
31,286.61	-----	1,376,847.50	2,209,778.20	31,286.61	3,617,912.31
24,627.00	-----	1,675,482.50	1,726,703.00	24,627.00	3,426,812.50
15,973.67	-----	1,091,857.50	1,132,750.00	15,973.67	2,240,581.17
23,833.90	-----	1,829,407.50	2,332,750.00	23,833.90	4,185,991.40
24,283.20	-----	8,108,797.50	3,834,750.00	24,283.20	11,967,830.70
23,987.52	-----	5,427,670.00	2,235,550.00	23,987.52	7,687,207.52
38,948.01	-----	3,756,447.50	1,873,200.00	38,948.01	5,668,595.50
41,208.00	-----	4,034,177.50	2,558,580.00	41,208.00	6,633,965.54
61,836.69	-----	20,202,325.00	2,374,450.00	61,836.69	22,638,611.69
64,157.99	-----	3,775,512.50	2,040,050.00	64,157.99	5,879,720.49
41,785.00	199.32	9,007,761.50	2,114,950.00	41,984.32	11,164,695.82
44,268.44	199.06	31,981,738.50	1,866,100.00	44,467.50	33,892,306.00
98,897.07	738.36	62,614,492.50	774,397.00	99,635.43	63,488,524.93
50,630.94	-----	56,846,187.50	999,410.00	50,630.94	57,896,228.44
66,411.31	648.47	39,377,909.00	9,077,571.00	67,059.78	48,522,539.78
42,361.56	276.79	25,915,962.50	8,619,270.00	42,638.35	34,577,870.85
15,748.29	282.50	29,387,968.00	3,501,245.00	16,030.79	32,905,243.79
26,904.63	202.15	36,857,768.50	5,142,240.00	27,106.78	42,027,115.28
177,834.56	175.90	32,214,010.00	5,478,760.00	178,010.46	37,870,810.46
246,000.00	-----	22,938,413.50	8,495,370.00	246,000.00	31,679,783.50
364,000.00	-----	14,780,570.00	3,284,450.00	364,000.00	18,429,020.00
205,660.00	-----	23,473,654.00	2,259,390.00	205,660.00	25,938,704.00
101,000.00	-----	83,395,530.00	3,783,740.00	101,000.00	87,280,270.00
280,750.00	-----	20,875,997.50	1,252,516.50	280,750.00	22,409,264.00
498,400.00	-----	22,445,482.00	809,267.80	498,400.00	23,753,149.80
529,737.14	-----	20,081,415.00	609,917.10	926,687.14	21,618,019.24
354,292.86	-----	28,295,107.50	691,005.00	968,552.86	29,954,665.36
98,265.00	-----	31,435,945.00	982,409.25	1,042,960.00	33,461,314.25
98,210.00	-----	23,828,625.00	908,876.25	1,819,910.00	26,557,411.25
102,665.00	-----	19,371,387.50	1,074,343.00	1,697,150.00	22,142,880.50
64,200.00	-----	17,582,987.50	1,266,143.00	963,000.00	19,812,130.50
4,680,577.44	39,926.11	729,047,572.50	136,478,368.40	10,891,393.55	876,417,334.45

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES
RECAPITULATION—Continued.

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
Brought forward.....	\$4,543,200.00	\$748,620.00	\$879,070.00
1870.....	240,300.00	40,050.00	17,225.00
1871.....	28,050.00	18,120.00	14,425.00
1872.....	301,800.00	25,860.00	1,300.00
1873.....	227,500.00	35,190.00	.....
1874.....	176,900.00	23,700.00	.....
1875.....	104,850.00	6,840.00	.....
1876.....	126,500.00	4,860.00	.....
1877.....	.....	.....	.....
1878.....	117.50	70.50	.....
1879.....	1,455.00	1,236.00	.....
1880.....	997.75	748.65	.....
1881.....	3,618.75	32,417.25	.....
1882.....	573,830.00	759.00	.....
1883.....	1,148,471.05	318.27	.....
1884.....	563,697.10	169.26	.....
1885.....	73,824.50	143.70	.....
1886.....	166,514.50	128.70	.....
1887.....	763,182.60	233.83	.....
1888.....	536,024.15	1,232.49	.....
1889.....	794,068.05	646.83	.....
1890.....	812,963.60	.....	.....
1891.....	841,717.50	.....	.....
1892.....	584,982.10	.....	.....
1893.....	668,509.75	.....	.....
1894.....	270,656.60	.....	.....
1895.....	498,994.20	.....	.....
1896.....	442,146.00	.....	.....
1897.....	1,021,436.75	.....	.....
1898.....	626,604.35	.....	.....
1899.....	1,301,451.55	.....	.....
1900.....	1,362,799.75	.....	.....
Total.....	18,807,163.10	941,349.48	912,020.00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
\$4,680,577.44	\$39,926.11	\$729,047,572.50	\$136,478,368.40	\$10,891,393.55	\$876,417,334.45
52,750.00		23,198,787.50	1,378,255.50	350,325.00	24,927,368.00
39,295.00		21,032,685.00	3,104,038.30	99,890.00	24,236,613.30
40,420.00		21,812,645.00	2,504,488.50	369,380.00	24,686,513.50
116,765.00		57,022,747.50	4,024,747.60	379,455.00	61,426,950.10
141,875.00		35,254,630.00	6,851,776.70	342,475.00	42,448,881.70
135,280.00		32,951,940.00	15,347,893.00	246,970.00	48,546,803.00
79,440.00		46,579,452.50	24,503,307.50	210,800.00	71,293,560.00
8,525.00		13,999,864.00	28,393,045.50	8,525.00	72,401,434.50
57,998.50		49,786,052.00	28,548,850.00	58,186.50	78,363,088.50
162,312.00		39,080,080.00	27,569,776.00	165,003.00	66,814,859.00
389,649.55		62,308,279.00	27,411,693.75	391,395.95	90,111,368.70
392,145.75		96,850,890.00	27,940,163.75	428,151.75	125,219,205.50
385,841.00		65,887,685.00	27,973,132.00	960,400.00	94,821,217.00
455,981.09		29,241,990.00	29,246,968.45	1,604,770.41	60,093,728.86
232,617.42		23,994,756.50	28,534,866.15	796,483.78	53,323,106.43
117,653.84		27,773,012.50	28,962,176.20	191,622.04	56,926,810.74
176,542.90		28,945,542.00	32,086,709.90	343,186.10	61,375,438.00
452,264.83		23,972,383.00	35,191,081.40	1,215,686.26	60,379,150.66
374,944.14		31,380,808.00	33,025,606.45	912,200.78	65,318,615.23
488,693.61		21,413,931.00	35,496,683.15	1,283,408.49	58,194,022.64
571,828.54		20,467,182.50	39,202,908.20	1,384,792.14	61,054,882.84
470,723.50		29,222,005.00	27,518,856.60	1,312,441.00	58,053,302.60
376,498.32		34,787,222.50	12,641,078.00	961,480.42	48,389,780.92
466,421.95		56,997,020.00	8,802,797.30	1,134,931.70	66,934,749.00
167,521.32		79,546,160.00	9,200,350.85	438,177.92	89,184,688.77
383,436.36		59,616,357.50	5,698,010.25	882,430.56	66,196,798.31
390,572.93		47,053,060.00	23,089,899.05	832,718.93	70,975,677.98
504,663.30		76,028,485.00	18,487,297.30	1,526,100.05	96,041,882.35
498,230.79		77,985,757.50	23,034,033.45	1,124,835.14	102,144,626.09
536,000.31		111,344,220.00	26,061,519.90	1,837,451.86	139,243,191.76
668,337.64		99,272,942.50	36,345,321.45	2,031,137.39	137,649,401.34
14,015,747.03	39,926.11	2,203,853,145.50	814,625,700.55	34,716,205.72	3,053,195,051.77

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